



CMP
ORBIS

Chemical Mechanical Polishing system
(Operation manual)

Safety Precaution Sheet

To be read carefully before use



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- 1 The operator should be fully aware of the use of the machine according to the Operation Manual.
- 2 The machine must be placed in an adequate working position, providing stable support and adequate ventilation. All functions on the machine and any connected equipment must be in working order.
- 3 Be sure that the supply voltage corresponds to the voltage stated on the back of the machine. The machine must be earthed.
- 4 Establish efficient exhaust from the working area if consumables containing alcohol, for example, are being used.
- 5 Make sure that the lapping or polishing plate is correctly mounted, the driving pins engaged with the holes in the turntable.
- 6 Keep clear of the rotating plate and specimen holder during operation. Make sure that any screws for clamping of specimens in holders protrude as little as possible.
- 7 Observe the current safety regulations for handling, emptying and disposal of the waste materials and fluids.
- 8 Always turn off the power and remove the plug or cable before opening the machine or working on any terminal connections.

The apparatus/machine is designed for use with consumables supplied by Logitech. If subjected to misuse, improper installation, alteration, neglect, accident or improper repair, Logitech will take no responsibility for damage(s) to the user or the equipment.

Dismantling of any part of the apparatus/machine, in case of service or repair, should always be performed by a qualified technician.

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1. Introduction

This manual is intended to give a description of the Logitech **CM61 Orbis CMP** machine together with details on its initial set-up, operation and maintenance.

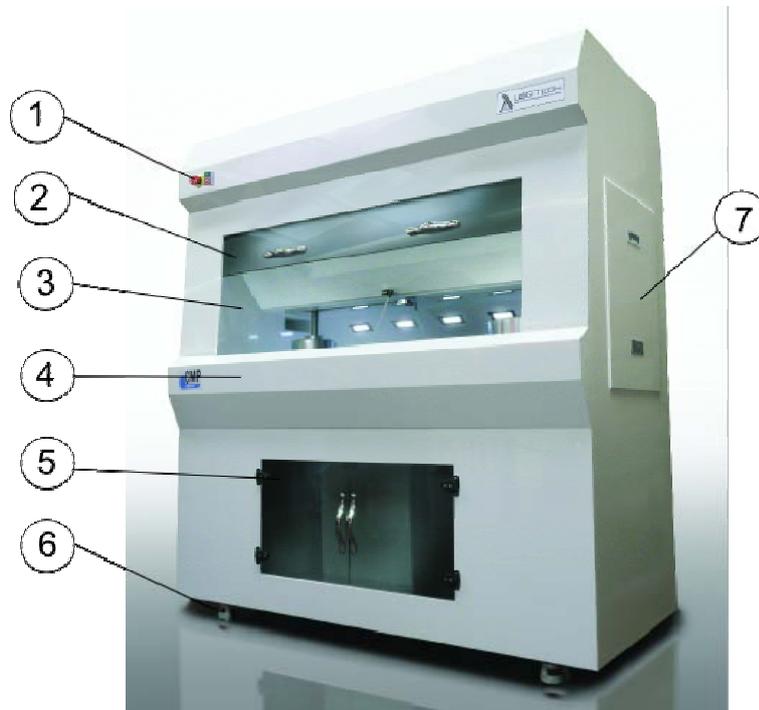
The **CM61 Orbis CMP** machine has been designed and produced to optimise safety and convenience of operation. It is the user, however, who has complete control and responsibility for safety aspects during installation and operation of the unit.

The user should be aware that the nature of the chemical polishing process demands care and personal protection at all times.

The customer must ensure that any extraction system used is suitable for use with the CMP process liquids and gases chosen, and that the system meets all local and national regulations on the safety and use of such chemicals.



2. Overview



- | | |
|---------------------------------|----------------------------------|
| 1. <i>Emergency Stop</i> | 10. <i>Work area lighting</i> |
| 2. <i>Sliding front window</i> | 11. <i>Carrier head</i> |
| 3. <i>Work Area</i> | 12. <i>Polishing head (Puck)</i> |
| 4. <i>(Removable) front bar</i> | 13. <i>Ventilation duct</i> |
| 5. <i>Storage space</i> | 14. <i>Carrier head</i> |
| 6. <i>Castors</i> | 15. <i>Polishing head (Puck)</i> |
| 7. <i>Side access panel</i> | 16. <i>Draining basin</i> |
| 8. <i>Window handle</i> | 17. <i>Polishing Plate</i> |
| 9. <i>Slurry feed Tubes</i> | |

3. Installation

3.1. Main dimensions:

Height	1950mm
Depth with Front Bar:	781mm
Bar removed:	736mm
Width	1680mm
Packed weight	730Kg
Machine Weight	501Kg

3.2. Forklift truck Usage

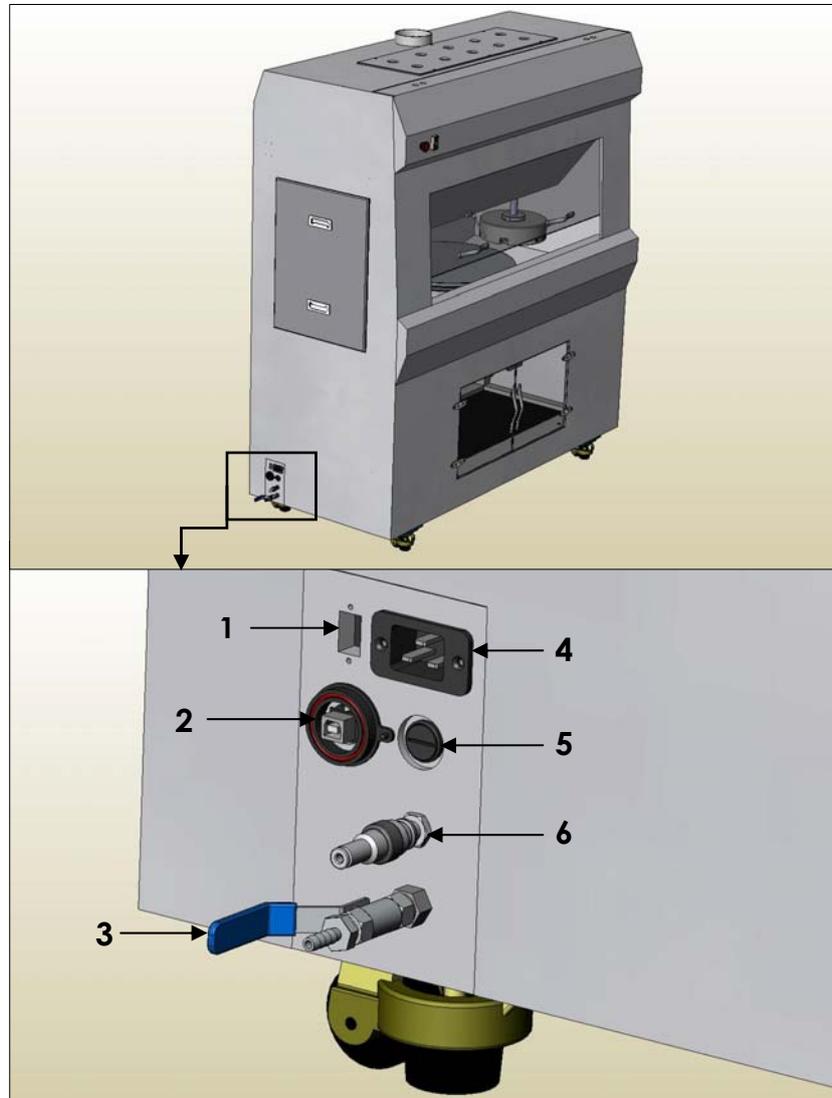
Ideally the machine should only be lifted inside its shipping crate. If it is absolutely necessary to lift the machine when removed from its packaging a gap of 100mm between the ground and frame will allow access for a fork lift truck. Care should be taken to insert the trucks' forks under both sides of the machines' sub-frame. If this is not done the machine will topple.

3.3. Exhaust Port

The exhaust flow rate should be consistent with any standard fume cabinet if the machine is to be used with hazardous slurries. The outer diameter of the exhaust port is 152mm, the inner diameter 146mm. As the port and cabinet are made from Polypropylene, these dimensions may vary slightly.

The flow rate is dependent on the room pressure being sufficient to create a positive flow direction into the cabinet.

3.4. Services Panel



- 1) Serial connector
- 2) USB Connector
- 3) Water inlet
- 4) Power socket
- 5) Fuse holder
- 6) Compressed air inlet

3.5. Electrical connections

A single 240v 16A socket on the services panel is used to power the machine. The laptop computer needs a 240v mains supply.

3.6. Slurry Waste

There are two waste pipes exiting the rear of the machine and these should be connected to an appropriate waste system designed to deal with the chemicals used and material removed during processing.



3.7. Compressed Air Inlet

Main line pressure required min -100 PSI. Inlet on services panel.

3.8. Main Water Supply

To be connected to the hose stem on the services panel. Ensure the yellow dust cap is removed from the valve before connecting the supply. Situated below the air / nitrogen inlet the main water supply inlet valve has an open / close lever and a barbed fitting on the end of it for attaching the appropriate tubing.

Plug end barb fitting: 6.35mm (0.25")

3.9. Computer Interface

The interface relies on two connectors on the services panel, the USB interface and serial connector. Both should be connected to the laptop. The interface will be examined more thoroughly in a later chapter when discussing machine controls.

3.10. Other Tasks

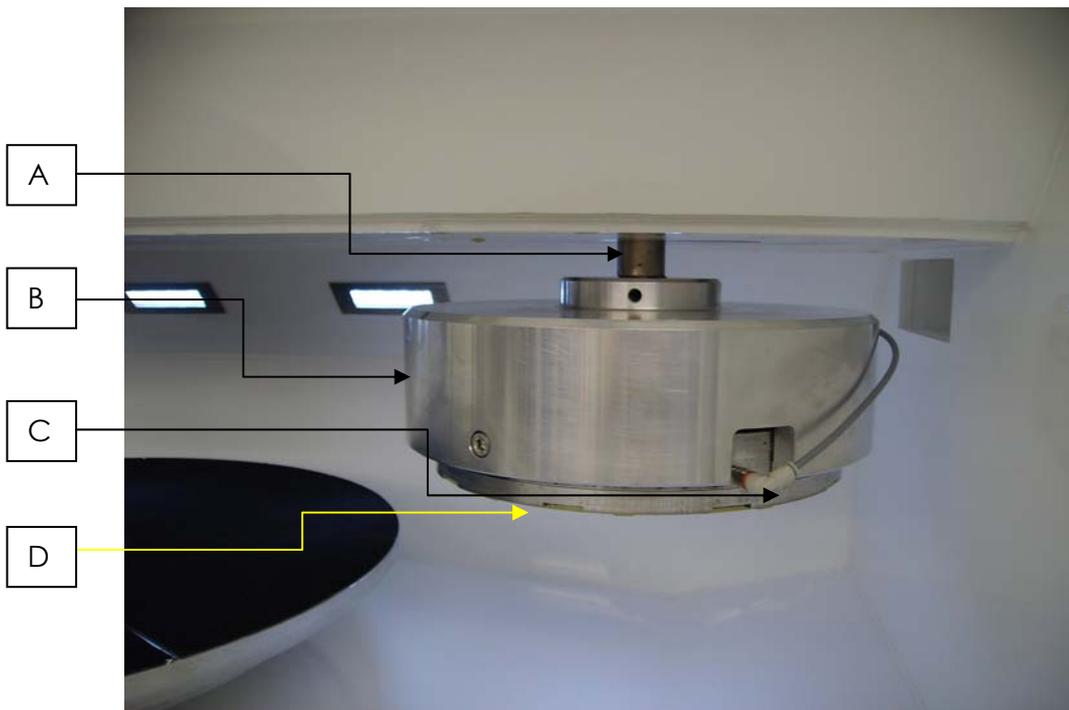
1. The inside of the work deck should be washed down prior to use in order that any dust which might have accumulated during transit be removed, using a suitable anti bacterial additive mixed with fresh water.
2. The polishing pad supplied with each CMP machine will not have been factory fitted, as to do so would lead to contaminants being introduced to the pad during transit. Each carrier supplied will usually have an appropriate template supplied along with a shim and insert kit. Custom designed templates can be supplied on request.
3. Positioning the computer is an important decision and one that should be addressed prior to the machine's installation. A suitable mains power supply is required in addition to the power requirements of the Orbis machine.
4. There will be movement between the computer and machine on a regular basis, so minimising the distance between the two would be of benefit to the user.

4. Sample Carriers

The selection of carrier heads and wafer / die holding templates available offer the user a diverse level of functionality. This functionality is derived from the features described below which, once combined, allow the CMP system to process many different materials of various sizes / dimensions. If you require further application specific templates please contact Logitech Ltd. or your local representative to discuss.

4.1. Carriers and their templates

The carrier assembly is split into two parts, the fixed carrier head (B) which is attached to the load rod (A), and the removable puck (D). The puck is interchangeable with a conditioning block (assuming carrier head and conditioning block diameters are the same). The machine comes as standard with one 4" carrier with conditioning block and one 8" carrier with polishing head. The removable polishing head uses a bayonet fitting to attach into the carrier head, with a simple quick release air connector (C) used to connect the back-pressure air supply.



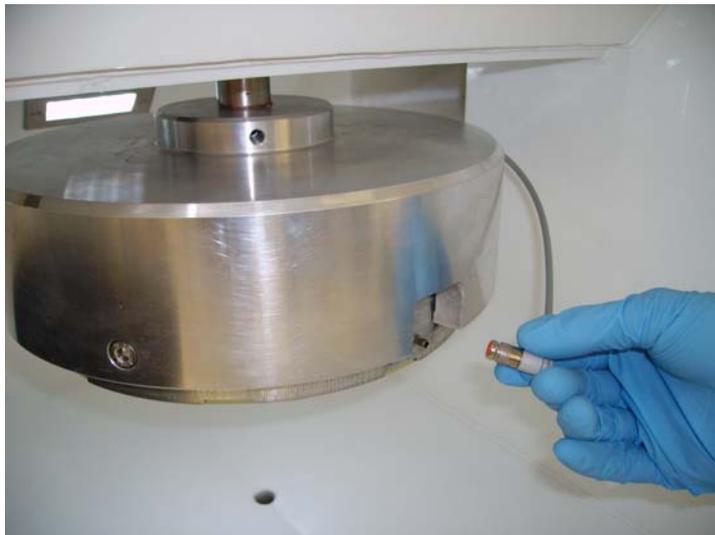
4.2. Attaching the polishing head

The polishing head is easily attached to the carrier head by following these simple instructions. Removal of the polishing head is simply the reverse of these instructions.

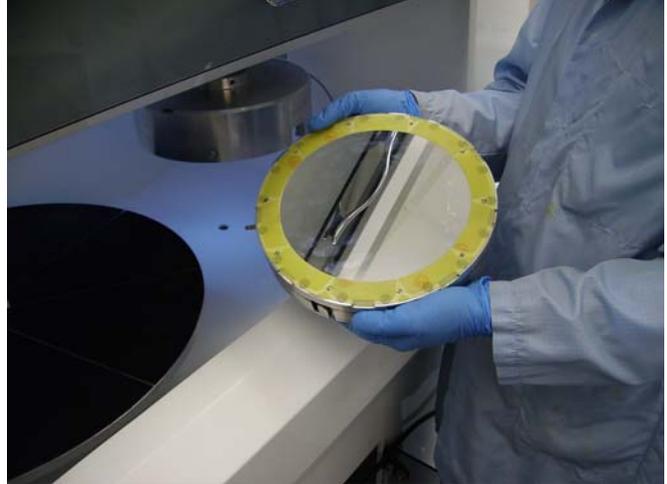
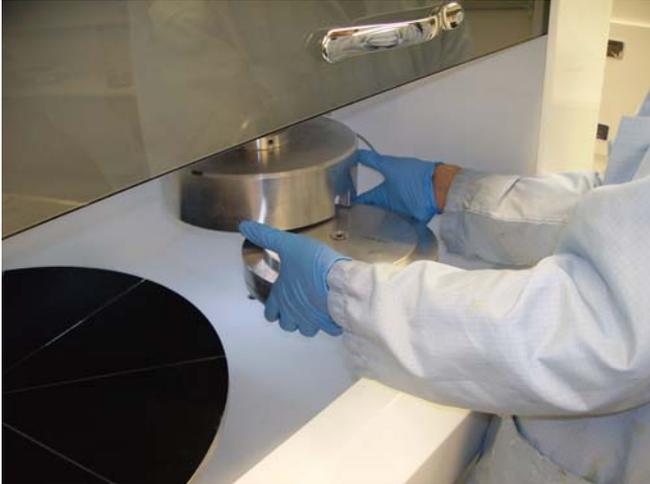
1. When finished with the combination of template and sample, introduce the puck into the carrier head, ensuring the air connector on the side of the puck aligns with the cut out on the carrier head (*refer to illustration below*).



2. When the puck and carrier head are aligned push upwards until the puck contacts with the inside face of the carrier head. Rotate clockwise. When the puck is released it will drop down into a channel and be held securely in a bayonet style attachment.
3. Attach the air supply to the puck using the quick release connector.



4. Removal of the puck from the carrier is made easier by compressing the puck against the carrier to evacuate the back-pressure air left in the system. Once done the puck can be rotated in a clockwise direction and removed.



4.3. Use of carrier shims, inserts and templates

When seeking to attach a template to the carrier please refer to **Equipment Note 31, "Applying Carrier Shims, Inserts and Templates"**. This Equipment Note provides step by step instructions in how to successfully attach the template to the face of the carrier.

All templates are mounted to the surface of the carrier by an adhesive film which allows a temporary bond. If various wafer / die / IC diameters are needed then optional additional carriers can be added to the system. This will provide processing flexibility without the need to discard templates before they are fully worn.

Templates consist of a circular plastic holder with an insert which uses capillary action to hold the wafer / die / IC in position. An outer ring surrounds the wafer / die / IC and contacts the polishing plate during processing.

Alternative technologies are used when the customer requires a unique solution. This may involve wax mounting of the wafer / die / components. Vacuum mounting may also be an option. Please contact Logitech Ltd. or your local representative if you require further information any of these options.

4.4. Replacing & mounting the template

When the template has become worn and requires replacement the operator simply has to peel the template from the carrier face. The carrier is then cleaned of excess adhesive and a new template can be fitted to the carrier face by simply pressing down on the exposed template adhesive. Care should be taken that any air trapped behind the template is pressed out to ensure that the flat bond required for good processing results is achieved.

Standard wafer templates can be replaced with custom designed templates to suit single / multiple die / part wafer processing. This comprehensive range of templates helps ensure compatibility with any process.

4.5. Carrier Loading

The carrier load onto the polishing plate is infinitely variable using the computer interface, allowing the operator to apply the appropriate load to suit the planarization or delayering operation. The minimum load that can be set is limited to 0.4psi.

Puck weight (8" standard puck)	6.38kg
Minimum load application	0.4psi

4.6. Carrier sweep

The carrier sweep function has two settings allowing both carrier heads to sweep across the rotating polishing pad. This motion, in conjunction with the carriers rotating, helps ensure an entirely even and sustainable level of material removal. Both Heads have approximately 118mm maximum travel (Carrier head diameter dependent). The required sweep is controlled using the computer interface.

4.7 Carrier back pressure

To ensure that the material shape being processed can be altered to compensate for irregular topographies, back pressure can be applied to the sample. The back-pressure applied is controlled using the computer interface.

Minimum Back pressure applied	0 Psi
Maximum back pressure applied	9 Psi

4.8. Carrier rotation

Each carrier is able to rotate in either a clockwise or anti-clockwise direction, and at speeds of up to 125rpm. The carriers will move with or against the polishing pad depending upon wafer material and start conditions. Different combinations will result in preferential material removal from various areas of a wafer surface, making a wafer convex or concave. Application of back pressure during rotation adds further material removal possibilities.

5. Slurry

The CMP unit's compatibility with a variety of slurries allows the use of acidic or alkaline solutions. Oxidising slurries and various pH values can be used on the one system provided different optional feed tanks are used to remove cross contamination.



5.1 Slurry Feed

The slurry feed rate is adjusted using the computer interface from 0 to 500mls/min. Through varying the toxicity and feed rate of the chemical mix onto the processing plate, the operator can produce the ideal conditions, or 'recipes' for successfully planarizing or delayering wafers, IC or Die.

5.2. Introducing slurry

Slurry is introduced to the system by using the two pipes connected to a peristaltic pump. Where these pipes are placed is dependent on the format of slurry container used, but in most instances it is simply a case of opening the slurry container and feeding the pipes into the opening.

6. Machine Controls & Software

CMP Labview Front Panel Software Description

Introduction

The Following document describes the User interface and it's software architecture of the Logitech Orbis/Tribo Front Panel.

Boot Up

When the machine boots up, the software looks for a configuration file in the same folder as the CMP.exe by default this will be C:\Program Files\Logitech CMP.

If this file is not found then the Config set up dialog is opened to set up the machine type and enabled features. Once this file is created, this Dialog will not be opened automatically. If for any reason the machine set up is to be changed then this can be done in two ways.

1. Delete the config.csf file from windows explorer.
2. Open the CMP front panel, then keep pressing "F4" this key press will open the Config file dialog.

Note: When running the front panel software from within the Labview development environment, the Front Panel Software will look and create the config.csf file in the directory containing frontpanel.vi

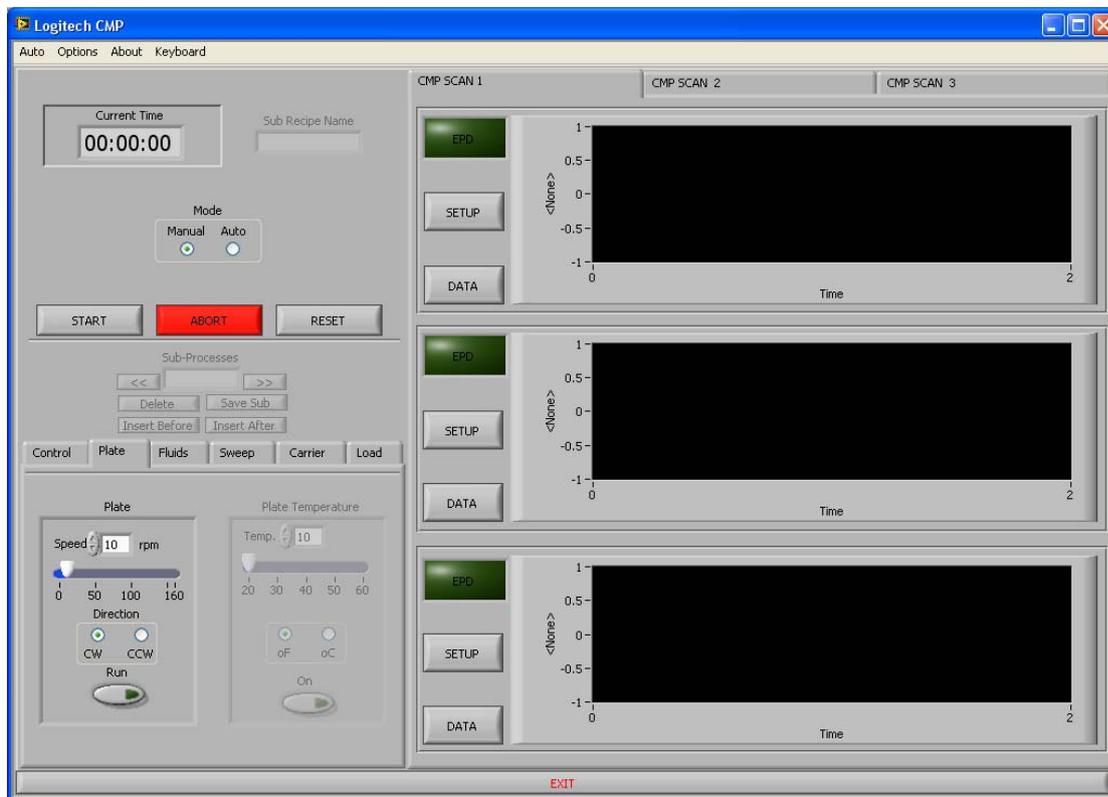
As part of the boot up sequence the user is prompted as to whether the machine is connected or not. If the user answers no the Front panel will operate in off line mode. An output window will open that displays the information passed to the machine control VI. In offline mode the software can be used to edit, create and test recipes.

Although the EPD/CMP Scan will plot data, this data is pseudo randomly generated.



User Interface Overview

The Front Panel VI contains the User Interface (UI) code. The Front Panel looks like this.



Controls

The description of the front panel controls below, describe the normal operation and use of these controls. In certain circumstances the software will intervene and not allow an operation to be carried out as it may result in damage to the machine. When this happens the Front panel will warn the user.

Examples of this are:

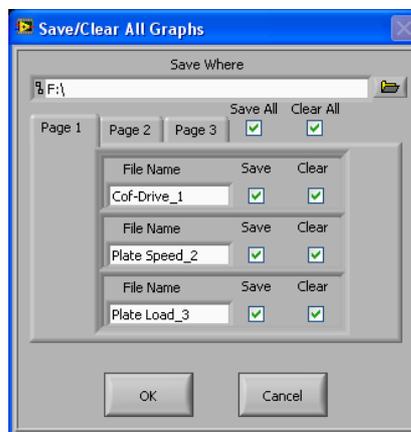
- Loading the machine in the parked position will only apply a reduced load.
- When the carrier is loaded and in the parked position, the Sweep button will be Greyed out to stop the carrier sweeping in and crashing into the side of the plate. (Orbis only)

1. Auto Menu. The Auto menu, contains the following, sub-menu's "New", "Open" and "Save As" These sub-menu's relate to the Auto Recipes, and perform no function when the machine is operating in Manual Mode.

- New: Loads a new default auto recipe.
- Open: opens a previously saved recipe
- Save As: Prompts the User for a file name, and saves the Auto recipe file.

2. Options Menu. The options menu contains the following Sub-menu's

- Save/Clear Graphs, this sub-menu allows the user to save and clear all the graphs together.



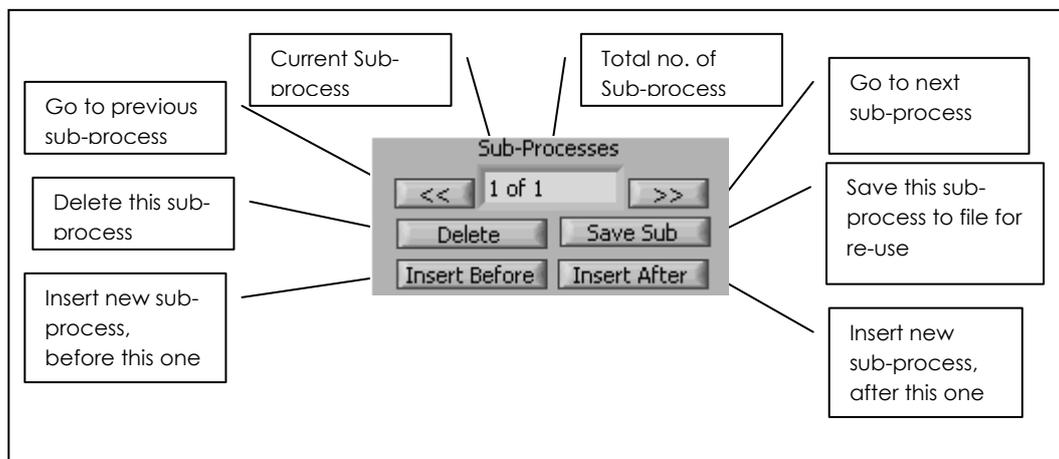
Clicking on the Folder Icon allows the user to select a location, the file names are given the following default File names "Parameter_GraphNumber" and are set to save and clear by default.

- **Machine Setup.** This sub menu allows the user to set the Carrier size, the edit mode (allows the recipe to be adjusted 'live' during a recipe) as well as setting up the default folder settings. This can be set to either remember the last folder or always open file browsers in the same place. This window will also display the hardware settings as defined in the Configuration file.
- **Sample Rate:** This allows the user to select the period between points on the Graphs.
- **About:** Contains information on the Front panel version number.
- **Keyboard:** Launches the Microsoft 'On Screen Keyboard' for users who prefer not to use the physical keyboard.

3. **Current Time:** This indicator displays the stopwatch output in Manual mode and the Timer Output in Auto mode.
4. **Sub Recipe Name:** This indicator displays the user definable name given to each sub-recipe in an Auto recipe. In manual mode this control is 'Greyed' out.
5. **Mode:** Allows the user to select Auto or manual mode. Auto mode the machine will perform the sequence described automatically. In manual mode each control acts upon the machine in real time.
6. **Start:** In manual mode this starts the Stop watches and the Data Capture. In Auto mode this Starts (or resumes) the Auto Recipe.
7. **Abort:** Stops the Machine immediately. This is analogous with switching off all the run buttons simultaneously.

NOTE: Carriers will unload and sweep will return to their park position.

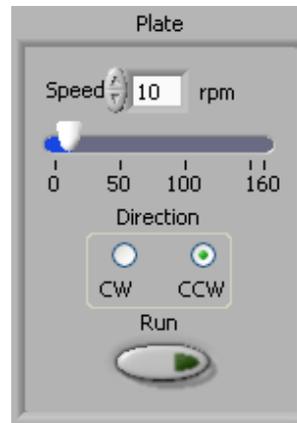
8. **Reset:** The reset button reset's the Stopwatch in Auto Mode and resets the recipe to the Beginning in Auto Mode.
9. **Sub-process Control:**



When inserting a New sub-recipe the user will be given three options.

- **Default**, inserts a default sub-process i.e. all numerics set to lowest value and run controls set to false
- **From File**, inserts a previously saved sub-recipe from file.
- **Copy current**, inserts a sub-recipe identical to the current sub-recipe.

10. Sub-system controls, each Sub system has a control, The Plate control will be used as an example of it's operation.



The sub-system controls operate differently in depending on which mode the front panel is set to. In manual mode the sub-systems will react immediately to any setting changes *. In Auto mode, by selecting the Run button means use this sub-system, and it's current settings in this sub-recipe. The numeric control, i.e. the plate speed, can be adjusted several ways, by dragging the slider with the mouse to the correct value, typing the correct value into the numeric box or using the up down arrows. The motor direction can be changed by clicking on one of the Direction Radio buttons, the Run button is operated by clicking the mouse on it.

* When changing sweep parameters, the new value will only come into effect at the next direction change. Also in certain circumstances the machine will not allow certain operations, i.e. if the carrier is loaded you can not start the sweep as it will crash into the side of the plate in the Orbis.

11. **Control**, This Tab appears differently in Auto or Manual mode. In manual mode the only control on this Tab is the Reset COF button, when this button is pressed the current machine condition is used as a Baseline for COF calculations. There will be more on the COF measurement later in this document.

In **Auto mode** there are several controls. Sub-recipe name is a text box to allow the user to give this sub-process a meaning full name to be displayed while the recipe is ran. i.e. Pre-process flush etc. etc. Time allows the user to enter the time that this sub-process is to run for. Note that if any of the EPD parameters are set to continue the Main recipe, then this time will be treated as a Maximum time. The Reset COF check box when checked means that at the end of this sub-recipe, the COF will be reset and the current machine reading's will be used as a baseline for the COF Calculations. Pause after, this check box when checked will cause the Main recipe to Pause after this section, the machine will unload and stop until the user presses the continue button.

EPD

The **EPD (End Point Detection)** software allows machine and process parameters to be displayed and recorded. The data can be displayed as a history in a graph format or as instantaneous data in the Gauge format.

In **Auto mode** each sub-recipe has an EPD set up, so that different parameters and control limits can be set for each sub-recipe. This function was moved under this button to allow the functionality of the Front panel to be altered without affecting the main layout.

Control Limits

The control limits can be set in two ways. Automatically, where the user enters a plus or minus % figure. The software then reads the parameter for the delay time, then adds the plus and minus figures to the average giving a top and bottom control line. In manual mode these limits are inputted by the user and will come into effect once the delay has passed.

With the EPD enabled the EPD LED will light up and a message will display what parameter has gone out of control. In Auto mode this can be set to trigger either the recipe to continue to the next sub-recipe or abort the process.

The graph or gauge display can be right clicked at any time to toggle the display from a graph to a gauge or vice versa. Right clicking the graph control also gives the user the option to Auto-scale the X and Y axis. When Auto-scale is not selected the scale can be adjusted by clicking on the maximum and minimum values and typing in the new values that the user wishes to be displayed.

Display

The display tab allows the user to set the average control. This control set's how many samples are used to create the rolling average plot. i.e. if your sample rate is set to 1 second and your average is set to five, the average plot will display the average of the last five sampled. During the first five seconds the graph will display the best average it can, i.e. after three seconds it will display the average of the three readings that have been taken.

The colour palettes allow the user to select different colours of each plot. The check boxes select whether the plot is displayed or not.

Data

The data button allows the chart data to be saved or cleared for the corresponding graph. The data can only be saved or cleared when there is no data being recorded.

6.1. Sample and Pad Cleaning

The CMP system has an inbuilt quick rinse spray gun to flush the wafer or IC with any outside pure water supply which can be connected to the rear of the machine. The internal spray gun can also be used to help flush the polishing pad or for quickly cleaning the conditioning block (as shown below right).



6.2. Operation and set up

Before operating the system, please check that all ordered accessory items such as pad conditioner, templates, pads and slurry are available.

6.2.1. Fitting the polishing pad

A standard Logitech polishing pad is supplied with every CMP system and will generally require regular conditioning. The pad is self adhesive backed and can be peeled off when fully worn or contaminated. A new pad is applied by peeling off the backing material and spreading the pad across the plate, pushing the trapped air bubbles in one direction as the pad folds down. A roller bar or wheel is useful for rolling across the surface once the pad is covering all of the plate. The backing paper that has just been removed can be laid on top of the pad surface to keep it clean if further processing is to be applied.

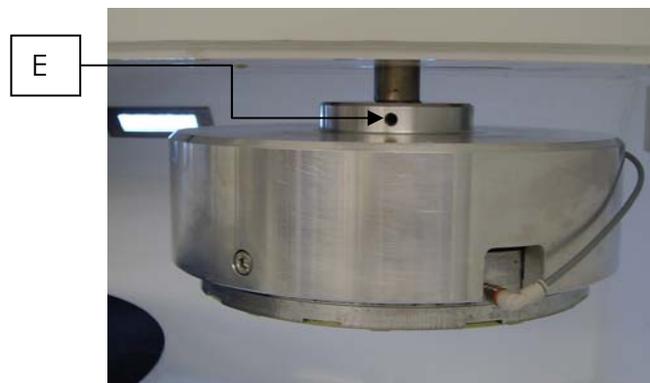
The first operation is to run the conditioning tool with water on the pad to prepare the pad surface prior to any processing of the wafers. To carry out this operation choose the conditioning option on the computer interface (see Machine controls for more detailed instructions).

The conditioning tool should initially be run for approximately 30 minutes or more, depending upon the individual pad's initial condition. The conditioning tool can be removed, cleaned and stored or can be left on the machine to condition the plate during processing.

6.2.3. Carrier and wafer setup

The load rods can be set up to apply the desired level of download pressure independently of each other, and the loads can be changed at any time. The load rod is ready to receive the carrier head. The carrier head and Polishing head are constructed from chemical resistant materials. The polishing head can have a template attached to its front surface appropriate to the size of wafer to be polished. For further information on fitting templates, inserts and shims please refer to section 4 of this manual and Equipment Note 31 (Applying Carrier Shims, Inserts and Templates). The wafer is fitted to the template by first immersing the template in water and then fitting any shims needed to compensate for the wafer thickness relative to the carrier depth. The wafer is then placed into the recess and pressed in place. The water holds the wafer in place through capillary action. The polishing head is then inverted and attached to the carrier head as described in section 4.2 of this manual.

Replacing the carrier head for a differently sized carrier is achieved by loosening the Allen bolts (E) on the top of the carrier head and freeing it of the load rod. Care should be taken as the carrier head is heavy.



6.2.4. Processing the wafer

Once the wafer has been fitted, the plate can be set to the required speed, the slurry flow started and the carrier brought down to the plate using the interface. The carrier should be lowered onto the polishing pad under the appropriate level of load. As soon as the carrier contacts the pad if back pressure is to be used the back pressure options on the computer can be set to the desired level. The carrier and wafer will start sweeping across the rotating polishing pad for the duration of the time set. Once the processing time has elapsed the pad can be sprayed with DI water and the carrier lifted from the pad by selecting the appropriate option on screen.

The piston will retract and the surface of the wafer should be sprayed immediately with DI water to stop any static etching or drying of the polishing slurry. Only after the wafer has been fully retracted should the plate be stopped. The Polishing head should be disconnected from the air supply and removed from the carrier head. The wafer can now be removed and cleaned thoroughly.

In the initial calibration stages for any new wafer process, several runs will be needed to observe the effects of any adjustment to the process and its effects on the wafer. For any further process technology information on specific CMP applications or high precision polishing operations please contact Logitech Ltd. for individual set up recommendations.

6.2.5. Emergency stop

Should the machine need to be switched off quickly for any reason an emergency stop button can be found at the front on the top left hand side of the machine. When the button is activated, the power to the machine will be cut off, stopping the plate and switching off all other machine functions.

To re-energize the system, release the emergency stop button by turning it clockwise.

NOTE: The machine will go through a full Diagnostic check after being switched back on and will not revert to the stage of the polishing process reached prior to being switched off.



7. Facilities Requirements

7.1. Dimensions

<i>Height</i>	<i>1950mm</i>
<i>Depth</i>	<i>781mm (736mm without front rib)</i>
<i>Width</i>	<i>1680mm</i>

7.2. Exhaust

<i>Exhaust Port</i>	<i>Circular with outer Ø152mm</i>
<i>Exhaust Flow</i>	<i>0.5m/sec face air flow</i>

7.3 Power Supply

<i>Machine requirements</i>	<i>240v 16A single supply</i>
<i>Computer requirements</i>	<i>240v mains supply</i>

7.4 Slurry Waste

<i>Drainage sites</i>	<i>2 waste pipes exiting rear of machine, Ø 25mm</i>
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7.5 Air Supply

<i>Pressure</i>	<i>100Psi Minimum</i>
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7.6 Clearance

<i>Clearance for slurry waste pipes at rear of machine</i>	<i>200mm</i>
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8. Product Specifications

The following specifications are subject to change due to our programme of continuous process development.

1CM61 Orbis

Power supply	240v 16A single inlet
Fuse rating	10A
Plate speed	160rpm
Plate diameter	600mm
Plate rotation	Forward & reverse direction settings
Carrier 1 speed	10 – 125rpm
Carrier 2 speed	10 – 125rpm
Max. Carrier1 back pressure	0 - 50psi / 344kPa
Max. Carrier2 back pressure	0 - 50psi / 344kPa
Max. Carrier1 down pressure / load	9psi / 62kPa
Max. Carrier2 down pressure / load	9psi / 62kPa
Min. Carrier1 down pressure / load	0.4psi / 2.8kPa
Min. Carrier2 down pressure / load	0.4psi / 2.8kPa
Carrier sizes available	4", 6", 8" (wafer sizes)
Height	1950mm
Depth	781mm (736mm without front rib)
Width	1680mm
Packed weight	730Kg
Machine weight	501Kg
Max. Slurry flow rate	500ml/min
Min. slurry flow rate	20ml/min
Chemical compatibility	Acidic & alkaline (see Appendix 1)
Cabinet details	Self contained chemical resistant*, floor standing cabinet

9. Spares and Accessories

1CM61 Orbis

<i>Cat. No.</i>	<i>Item</i>	<i>Qty</i>
1CM61	Instruction Manual	1
2ELC-923-01	Mains Power Cable, 16 amp	1
1CDP85	CM61 Polishing Head 8"	1
1CDP45	CM61 Polishing Head 4"	1
1CDTL61-0800	8" Wafer Template	1
1CMAC-0700	Polishing Pad Conditioner	1
2COM-011	Laptop Computer with pre-loaded software	1
2COM-012	Waterproof Keyboard	1
2COM-013	Waterproof Computer Mouse	1
2ELC-933	USB Connecting Cable – Laptop / Machine	1
2ELC-929	Hardware Dongle for Laptop Computer	1
2MSC-026	Hexagonal Wrench Set	1
2PNR-498	Peristaltic Pump Tubing	1
2PNR-519	Drain Tubing (1M Length)	2
2PNR-497	Water Supply Tubing (2M Length)	1
2PNR-493	Air Supply Tubing (2M Length)	1
2PNU-377	Air Supply Connector	1
1PCMA6-0100	Polishing Plate for 1CM61 Machine	1
0CON-369	Polishing Pad for 1CM61 Machine	1

For a full list of available spares, consumables and accessories please contact Logitech Ltd, or your local Logitech representative. Details can be found on Page 29.

10. Appendix 1 – Chemical Compatibility Table

1. Appendix 1

Chemical Compatibility Table

Note: To be used for the main casing, process area and slurry tank.

Key:

- + represents excellent chemical resistance
- 0 represents good or limited chemical resistance
- represents low chemical resistance

Halogenated	0
Acids (weak / diluted)	+
Acids (strong / concentrated)	+
Acids (oxidizing)	0
Bases (alkalis)	+
Alcohols (aliphatic)	+
Aldehydes	+
Esters	0
Ethers	-
Ketones	0
Aliphatic	+
Aromatic (Benzene)	0

Note: The polishing plate is made of a different material and may be affected by different chemical attack.

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