

Planmeca PlanMill® 40 S User Manual

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PlanMill 40 S Introduction

Indications for Use

The PlanMill 40 S is a dental milling machine used to fabricate restorations from compatible dental materials.

Startup Procedure

Press the green button on the front of the mill to turn it ON.

When the mill software loads, the initializing screen appears. Close the lid firmly and wait for the software to automatically load.

Lid Lights

The lid lights change color based on the status of the mill.

Lid Color	Description
Blue (solid)	Mill is initializing
Green (solid)	Mill is idle or is milling. It can accept instructions (select restorations, cancel milling, replace tools, etc.)
Green (flashing)	Milling complete. The restoration has completed milling and the lid is open.
Red (flashing)	The mill has faulted. Warning screen: Re-initialize to clear the fault or enter the diagnostic state to attempt to diagnose the problem.
White	Lid is open.
Yellow	Warning message displayed.

Shutdown Procedure

The mill should remain ON during the week. Turn it OFF at the end of the week.

- 1 Touch the **X** in the top-right corner of the display. A verification screen appears, touch OK.
- 2 Close the lid if it is open. The lid stays closed while the mill runs its closing procedure. The lid opens automatically, leave the lid open.

The desktop for the operating system (Windows) appears.

- 3 **Ensure that all mill motor movement has stopped.** Press and hold down the green power button for approximately 10 seconds. This process will prompt the operating system (Windows) to shut down.

The screen and red button will go dark.

Relocating the Mill

Warning: The mill weighs approximately 170 lb. (77 kg). Always follow these guidelines when relocating the machine.

When relocating the mill, remove the tank from the machine.

The Mill is designed to operate on a level and stable surface in an environment free from excessive moisture or dust. When choosing a location for the mill, adhere to all clearance requirements stated in System Specifications.

- 1 Ensure no milling operations are in progress.
- 2 Open the front access panel and remove the fluid reservoir.
- 3 Empty the fluid reservoir according to your approved material disposal protocols.
- 4 Turn OFF the mill.
- 5 Disconnect all power and data connections.
- 6 Move the mill onto a cart that is capable of supporting the weight of the mill and its accessories. You are advised to use a suitable cart rather than moving the mill by hand. Lifting and carrying should be kept to a minimum.

The mill weighs approximately 170 lbs (70 kg). Lifting the mill requires at least two people.

Those lifting the mill should:

- Stand close to the mill with their feet approximately shoulder width apart, and one foot slightly in front of the other for optimal balance.
- Squat down by bending at the knees, not at the waist, keeping their backs as vertical as possible.
- Firmly grasp the mill before beginning the lift.

Be certain to lift the mill by the underside metal bottom plate located on each side of the mill, not by the plastic covers..

- Refrain from twisting their bodies and slowly begin lifting, using their legs, not their back, to lift.
- Keep the mill as close to the body as possible to minimize stress on the back.
- If turning is required, turn by shuffling their feet, not by twisting their body.
- If it is necessary to place the mill below the level of their waists, each person lifting should follow these procedures in reverse order, keeping their backs vertical and bending at the knees.
- Be careful to avoid obstacles.

System Information and Upgrades

Software and Hardware

System software and hardware upgrades are initiated through E4D Technologies only. No software or hardware should be added or deleted to/from the E4D systems without prior approval of E4D Technologies. Doing so may result in damage to the system and will void the product warranty.

Mill Software Version

The version number is displayed on the home screen.



When placing a call for service or support, you may be asked to provide the serial number, model number, software version number, or similar identifying data. The serial number and model number are located on the Product Identification Label, affixed to the rear of each unit. “Labels” on page 48.

PlanMill 40 S Safety

Warning: Failure to adhere to all safety warnings may result in personal injury, equipment damage, or data loss.

The mill weighs approximately 170 lb. (77 kg). When lifting or moving the mill, follow the guidelines in *"Relocating the Mill"* on page 5.

Always ensure the mill is on a surface capable of supporting its weight of approximately 170 lb. (77 kg).

Use caution when handling the mill's cutting tools.

Before milling a restoration, ensure the mill has adequate milling fluid. Adequate milling fluid is required to prevent overheating and possible damage to the restoration blank and cutting tools.

Do not open the mill's lid while a milling operation is in progress. Doing so will result in the loss of data and restoration block; the milling process will have to be repeated.

This equipment is intended to be grounded. Connect the products to earth grounded outlet only. Power strips or extension cords should not be used.

If a power cord (other than the one provided with the equipment) is used for connecting to the power source, ensure it meets all of the following requirements:

- Detachable power supply cord
- Type SJT
- 18 AWG 3 conductor
- Rated 10 A or better
- For products outside of the United States and Canada, the power cord must be marked "HAR" or with a suitable agency marking from the country of intended use. The attachment plug and appliance coupler must be marked with a suitable agency marking from the country of intended use.

Do not use the products for any purpose other than its intended and labeled use.

To prevent electrical shock, do not open any sealed or user restricted access panels or connectors.

A detachable non-locking type power cord has been provided with this equipment as the disconnect device. Do not block access to the power cord. In case of emergency, remove power from the device by unplugging the cord at either end.

Do not block any of the product's cooling vents located on each side and lower rear panel. Doing so may result in overheating and damage to the products and will void the product warranty.

When placing components, adhere to all clearances stated in *"Minimum Clearance"* on page 46.

Do not make any unauthorized repairs or modifications to the system software or hardware. This includes installing unauthorized software on the computer system or altering or bypassing any safety switches or mechanisms.

Do not install or operate the products in an environment where an explosion hazard exists, e.g., high oxygen area.

Comply with all applicable regulations when disposing of waste materials.

Do not attach any equipment or devices to the mill unless their use has been specifically authorized by E4D Technologies or Planmeca.

The wireless components in the products may be interfered with by other equipment, even if the other equipment is fully compliant with CISPR (International Special Committee on Radio Interference) emission requirements.

When possible, electrical equipment should not be used when adjacent to other electrical equipment. If adjacent use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

When connecting the components, use only the cables supplied with the products. Failure to do so may result in increased electromagnetic emissions or reduced immunity to external electromagnetic emissions.

Ensure your mill is properly maintained through periodic maintenance.

If you suspect equipment malfunction or failure, discontinue using the mill and contact E4D Technologies Technical Support immediately. Do not attempt to make any repairs on the mill.

Read and comply with all safety, warning, and instructional labels on the mill.

Operating the Mill

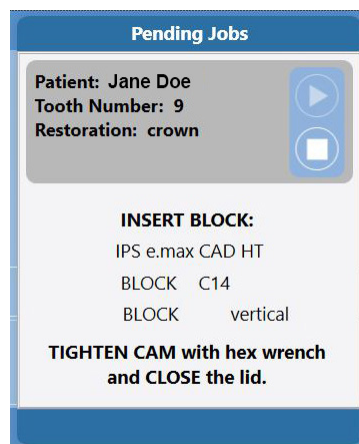
Pending Jobs

The Pending Jobs list is the default screen.



Always wait until the lid lights turn green before making any selections on the touch screen.

- 1 Scroll to find the desired restoration by dragging a finger up and down the restoration list. Touch the desired job to select it.
- 2 The system opens the lid and prompts you to insert the block that matches the material selected in the Design software.



*Touch the **Stop** button to return to the jobs list.*

Inserting Blocks

Blocks can be inserted vertically or horizontally. The Insert Block screen specifies the block orientation. Notice the notches face right in the examples below. If the notch is pointing to the left, you will not be able to insert the block. Round blocks use the vertical orientation of the mandrel.

The mandrel is the metal piece of the restoration block that is inserted into the mill to hold the block steady during milling.

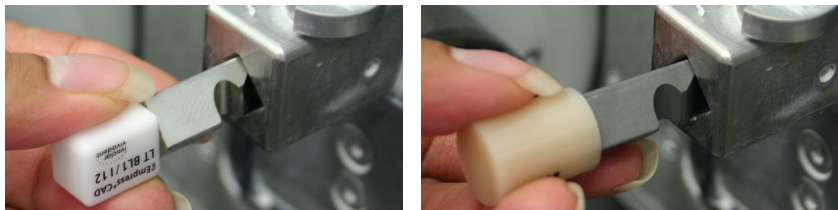
Horizontal Orientation

For the horizontal orientation, the wide side of the rectangular block faces up, with the mandrel notch points to the top right. This side will usually have the printed label. Note the position in the picture below.

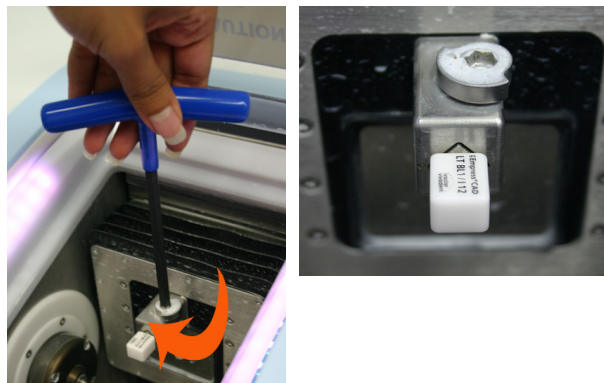


Vertical Orientation

For the vertical orientation, the narrow side of the rectangular block faces up, with the mandrel notch points to the bottom right. The round blocks are inserted with vertical orientation.



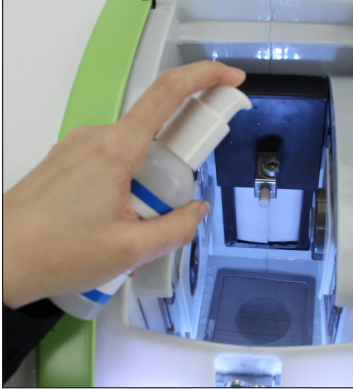
- 1 If you are unable to insert the block fully, insert the Mandrel T-Handle into the cam and turn 180 degrees counter-clockwise to loosen the cam.
- 2 Insert the block in the correct position and lock the block in place by tightening the cam.



Composite Block Defoaming Solution

A Defoaming Solution is recommended when milling resin-containing or composite blocks. Without the defoaming solution, the milling fluid may foam and overflow.

- 1 After inserting the composite block into the milling chamber, shake the bottle of defoaming solution and position it over the chamber.



- 2 Press down once to release the solution directly into the milling chamber.
- 3 Close the chamber and begin the milling process as explained below.

Milling Zirconia

See the manufacturer's Instructions for Use provided with the zirconia blocks for processing instructions.

Scale Factor

Zirconia shrinks in the sintering oven. There are numbers on the side of the blocks. The Mill asks for the Scale Factor before a zirconia block is milled. The system will increase the size of the restoration according to this number. This means you cannot test the fit of the restoration before sintering.

Cleaning the Tank

The mill will prompt you to clean the tank. It is necessary to clean the mill and change the water **before** milling zirconia. If the zirconia is contaminated with other materials, **it will turn green when sintered**. Cleaning after milling is recommended because the zirconia acts as a thickening agent with the water. It is not necessary to clean in between sequential zirconia jobs, although the mill will ask if the tank is clean.

Long Tools Required

Longer tools are required to mill Zirconia: Conical 12.6 and Tapered 13.2

Starting Milling

Milling is an automated process that varies in length of time based on the restoration data.

- 1 After inserting the block, close the lid firmly and wait for the lid lights to turn green.

The system checks the positioning of the block and begins generating the toolpath.

Once the toolpath has been generated, the milling will begin and the milling time will be displayed.

See the Troubleshooting section for assistance if you experience a problem generating a tool path or if the mill times out.

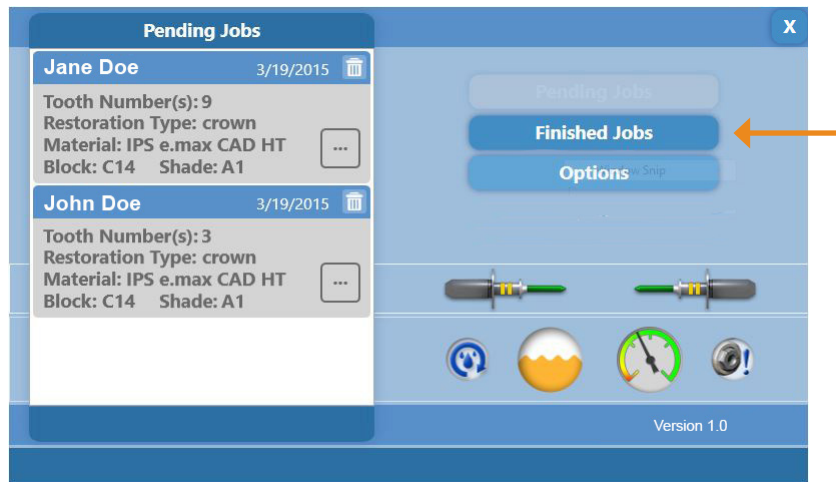
After the milling process is complete, the lid automatically opens.

- 2 Remove the restoration and any debris and close the lid firmly. This allows the mill to prepare for the next job.

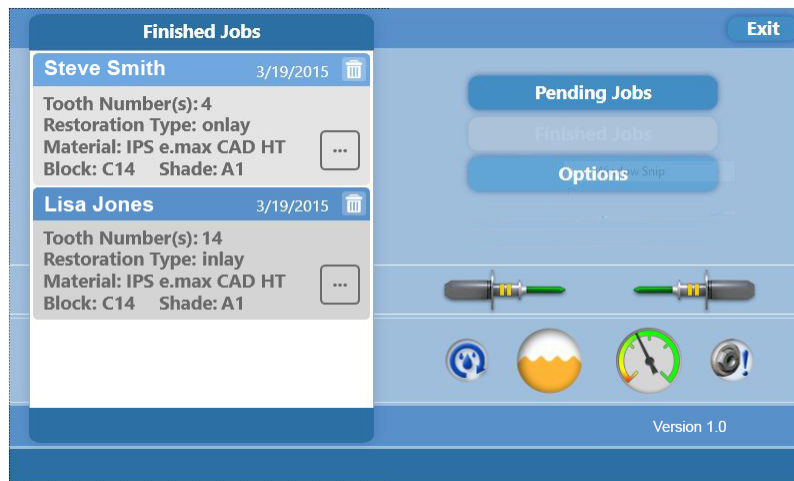
Finished Jobs

Previously finished jobs can be milled again if desired.



- 1 On the main screen, touch **Finished Jobs**.



The Finished Jobs list appears.



- 2 Touch the desired job to select it.

3 Touch the **Play**  button to start the job or the **Stop**  button to return to the case list.

You are prompted to insert the appropriate block. Milling continues as usual.

Deleting Jobs

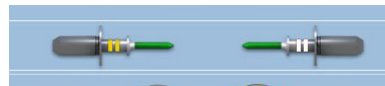
Click the trash can next to a job to delete it. Deleted jobs cannot be recovered on the mill, but can be resent from the design software.



Automatic Tool Changer

The Mill's automated tool changer holds an array of grinding tools. The tool changer switches between grinding tools as the milling task demands.

The main screens display a graphic that indicates the status and type of tool in each spindle.



Tool Type	Tool Stripe Color
Ellipsoidal	Yellow
Tapered	White
Conical	Blue

Tool Status

The color of the tool tip changes based on the number of minutes used in milling.



Change the tool when it turns red.



Too worn down to be used

Broken

See “Replacing/Inserting Tools” on page 15 to fill the tool changer, exchange tool shapes, or to replace broken tools.

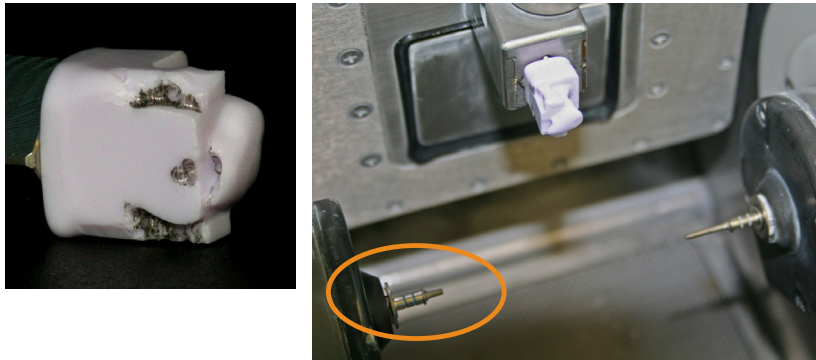
Broken Tools

If toolbreak is detected during a job, the toolpath is suspended and the tool length is checked to confirm the break.

- If the tool break is confirmed and a suitable replacement is available in the Tool Changer, then the tool is automatically loaded and continues with no operator intervention required.
- If the tool break is confirmed but a suitable replacement is not available in the Tool Changer, then the operator is prompted to load a replacement tool or abort the job.
- If the tool length is found to be normal then the job continues with no operator intervention.

Restoration Inspection

If a conical tool breaks halfway instead of at the shoulder, the broken tool may not be detected right away. If the broken tool continues to mill, it can cause damage or put black marks on the restoration.



By default, the new Restoration Inspection feature is activated.

If a tool breaks:

- The lid lights turn blue and the lid pops open
- The operator assesses the restoration and closes the lid

Once the lid is closed, a new message displays.

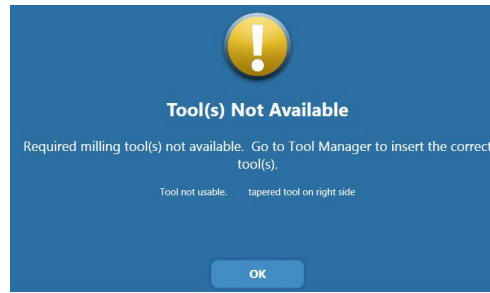
If the restoration has black marks or has come off of the mandrel, click No. The lid pops open. Remove the block. Select the job to restart milling. The system will prompt you to insert a new block at the beginning of the restarted milling process.

To continue milling with a new tool, click Yes.

To deactivate this feature, contact Customer Support.

Replacing/Inserting Tools

If a needed tool is not already in the tool changer, the following message will appear.



Possible reasons for replacing a tool include:

- Tool(s) needed for the restoration are not in the tool changer.
- Fill empty slots in tool changer.
- Tool is broken or too worn down to use.

- 1 On the main screen, touch **Options**.
- 2 Touch **Tool Manager**.
- 3 Touch the desired tool or empty slot to see more information and options.

The tool or empty slot changes color when selected.



- 4 Select the desired option and follow the on-screen instructions.
 - Put in Spindle - move a tool from the tool changer to the spindle
 - Put tool away - move a tool from the spindle to the tool changer
 - Remove from mill - take tool out of the mill and leave this spot empty
 - Replace this tool - remove this tool from the mill and replace with a new one
 - Measure this tool - calculate the length of the tool
 - Verify tools - displays screen to visually inspect all tools and change tool types in the software if needed

When placing a new tool in the collet, ensure it is pushed all the way in (fully seated). Hold the tool in place and touch Next Collet.

The system measures new tools and suggests a tool shape. Select a different tool type if necessary.

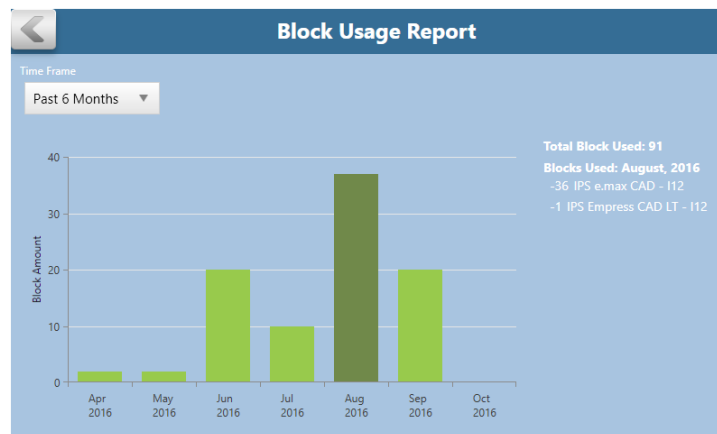
Close the lid firmly when finished.

Reports

- 1 On the main screen, touch **Options**.
- 2 Touch **Reports**.
- 3 Touch one of the reports to view it.
- 4 Select the desired **Time Frame**.
- 5 In Block Usage and Tool Performance, touch a month on the graph to see detailed information on the right.

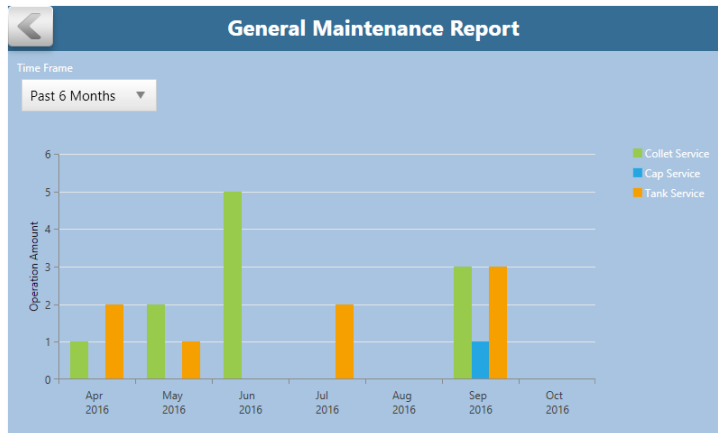
Block Usage

- Graph represents the total number of blocks used each month
- The number of Total Blocks Used is for the selected Time Frame.
- Touch a month to see how many of each block type was used that month. The selected month displays as a dark green.



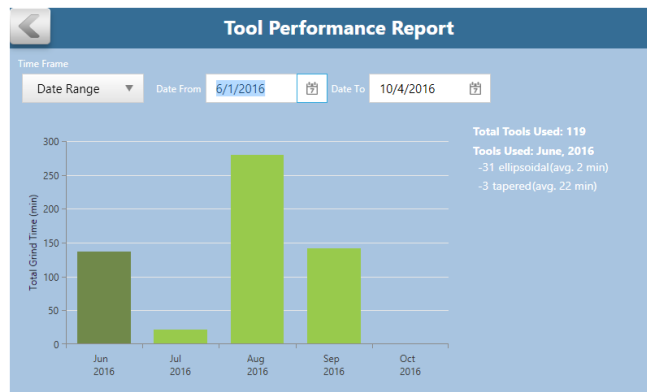
Maintenance

- The graph represents how many times the collets, caps, and tank have been serviced each month.




Tool Performance

- Graph represents the total minutes of grinding time per month
- The number of Total Tools Used is for the selected Time Frame.
- Touch a month to see how many of each tool type was used that month and what the average grinding time was for each tool. The selected month displays as a dark green.




Mill Troubleshooting/Repair

If you have questions, please contact Customer Support at

Toll Free	800-537-6070
E-mail	customersupport@planmecausa.com
Fax	972-479-1106
Hours of Operation	7 am – 6 pm CT
Web site	www.e4d.com
Mailing Address	 D4D Technologies LLC dba E4D Technologies 650 International Pkwy Richardson, TX 75081 USA

Mill

Symptom	Probable Cause	Corrective Action
Mill does not turn ON	Power cable unplugged	Verify power cable is plugged into a live AC outlet.
	Power supply switch turned OFF	Set power supply rocker switch at rear of mill to ON position.
	Faulty ON/OFF switch	Call Customer Support.
Block orientation on mill incorrect.	Dirty Block Orientation Sensor	Using a small/long object, push very gently on the sensor switch two or three times.
Pump making fast thumping noise.	Dirty tank and/or filter	Clean tank and filter.
 Air failure message	Loss of air pressure	Ensure there is power to the office compressor.
	Air line loose	Secure air line from compressor to mill.
Fluid Level Low Message	Low water supply	Fill tank with water.
	Faulty sensors	Clean or replace sensors (Call Customer Support)
Tool stuck in collet	Collet rusty or caked with ceramics	Remove tools manually. Done in the maintenance/ command screen on mill. (Call Customer Support for assistance).
	Tool jammed due to air pressure	Verify the supply air pressure 50 psig. Verify the pressure multiplier is maxed out. i.e. the adjustment knob is turned fully clockwise this doubles the pressure to 100 psig.
Not generating tool path	Incomplete information from the Job Server	Restart Mill.
Milling is not completing on the facial surface of an anterior tooth	Restoration is longer than normal	On the design software, change the block selection to Multi Block, but be sure to select the same block size. You can then insert a standard Empress LT or HT block of the same size. The Mill makes multiple passes on Multi blocks while other materials use a single pass.
Unpleasant odor	Improper cleaning of the mil. Normal weekly changing of the milling unit's circulation system coolant should be all that's required to keep the coolant tank clean and effective	A bleach flush can effectively correct the problem. Have bleach on hand and ready, then call Customer Support for help with the process.

Preventive Maintenance/Cleaning

Routine Mill Maintenance

Cleaning Cycle: High volume offices should clean daily. Most offices will need to clean weekly.

The mill must be cleaned more often when e.max or zirconia blocks are used.

Cleaning the chamber and replacing milling fluid are required to ensure proper operation of the mill.

Warning: Operating the Mill with insufficient milling fluid will damage the mill, void your warranty, and destroy the restoration that is being milled.

Clean Outside of Mill

Wipe down the outside of the mill with damp paper towels. Do not spray or pour liquid directly on the touch screen.

Clean Fluid Tank:

The Clean Fluid Tank icon turns red when the tank is scheduled to be cleaned. Touch the icon at any time to see how many milling hours are estimated before the tank needs to be cleaned.



- 1 Touch and hold the **Clean Fluid Tank** icon.
- 2 A message appears and shows the number of hours remaining before a scheduled cleaning is needed. Touch **Next** to continue.
- 3 Follow the on-screen instructions.

The tank and filter should be cleaned once a week to prevent mold growth or build-up of ceramic material and for optimal circulation. High volume offices need to clean the tank and filter more frequently.

Refill milling fluids:

The water level icon shows when the water level is too low to continue milling.

Add water to the tank before starting your next job.



- 1 Slowly pour one gallon of water into the chamber and watch the fill indicator. Stop when it blinks green.
- 2 Continue with the normal milling procedure.

Zirconia Mill Maintenance

It is necessary to clean the mill and change the water **before** milling zirconia. If the zirconia is contaminated with other materials, it will turn green when sintered. Cleaning after milling is recommended because the zirconia acts as a thickening agent with the water.

Spindle Cap and Collet Cleaning

Cleaning Cycle: As Needed

Over time, residue from the milling process may build up in the spindle caps and/or on the collet. This inhibits coolant delivery and/or reduces the spindle's tool holding capability. Clean the collets and spindle caps when the icon turns red or the tools "walk" (do not stay flush with the spindle) during a restoration. Replace the fluid regularly to reduce residue buildup.



The Collet Cleaning icon turns red when the collets or spindle caps are scheduled to be cleaned. Touch the icon at any time to see how many milling hours are estimated before they need to be cleaned.

- 1 Click **Next** to proceed with cleaning.
- 2 Select the **Guided** or **Advanced** wizard.
- 3 Follow the on-screen instructions.
- 4 Close the lid firmly when finished.

Importing for Milling

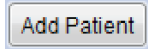
STL files can be imported and sent to the mill. A patient must be created for these cases.

Managing Patients in Planmeca Romexis

Creating new patients

- 1 In Patient Management, click the **Add Patient** button.

The Add Patient screen opens.



- 2 Enter the necessary information and add a face photo if desired.

The obligatory fields are in bold text. See the Romexis User Manual for more information.

- 3 To save the patient into the database click the **Save** button in any section.

The changes are not saved unless Save button is used.

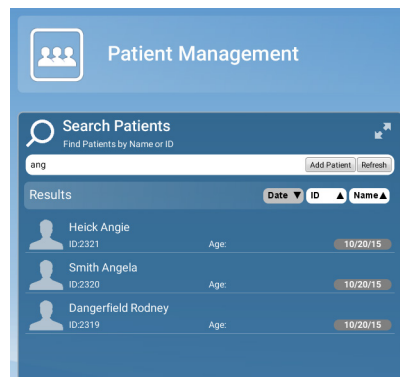
To view the newly created patient on the list, perform new patient search.

Searching Patients

Patients can be searched by ID or by name.

In Patient Management, type any part of the patient's name or ID number into the Search field. Matching items automatically appear as you type.

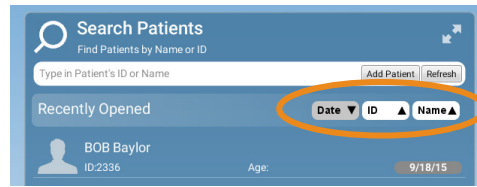
The system looks for the letters or numbers anywhere in the patient's name or ID. Angela, Angie, and Dangerfield are all matches for "ang" in the Search field.



Sorting patients

Patients in the patient list can be sorted by the Date their records were previously accessed, their ID number, or their last Name.

To sort patients click the desired sort button.



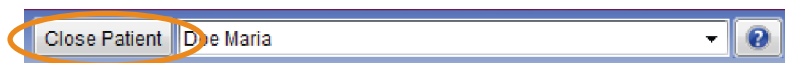
Selecting and opening patients

- 1 Click the patient name in the patient list.

The patient's file opens.

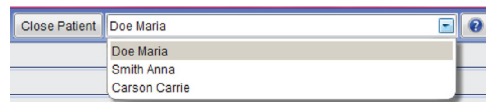
The name of the active patient is always visible in the upper right corner of the screen. Several patient records can be open at a time but only one of the open records is active at a time.

To close the active patient click the **Close Patient** button.



To view all open patients click the arrow of the drop-down menu.

To select and modify another open patient, select the name from the drop-down menu.



- 2 Click **Go to CAD/CAM** in the Next Steps section at the bottom of the screen or on the Charms menu on the left side of the screen.

Managing Cases

- 1 Open the desired patient.
- 2 Click **Go to CAD/CAM**.

Select what you want to do:

- Start a new restoration - See below for more information
- Open an existing restoration - See below for more information
- Import 3D models - See Planmeca Romexis User's manual for more information
- Export 3D models - See Planmeca Romexis User's manual for more information

Deleting Files

To delete an image (stl file) from the patient's case files right-click on the file and select **Inactivate STL**.

To delete a case from the patient's case files right-click on the case and select **Inactivate restoration**.

To reactivate or permanently delete a case from the database see the Romexis User Manual.

Import for Milling

- 1 Open the patient file.
- 2 Open the CAD/CAM module.
- 3 Under Import 3D Models, click **Import for Milling**.

Follow the on screen prompts to find the files and import them.

- 4 Double click the Patient's Case File to open it.
- 5 The case opens in the Mill screen.

Mill Screen

This section contains specific instructions for imported restorations. For full Mill screen instructions, see the PlanCAD manual.

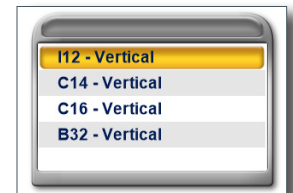
Specify the Material

- 1 Click **Settings** in the top right corner.
- 2 Click **Material/Shade Settings**.
- 3 Use the arrows to select the **Material, Translucency, and Shade**.
- 4 Click **Save**.



Select a Block Size

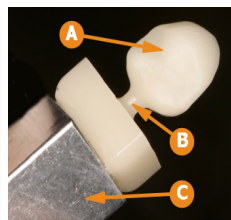
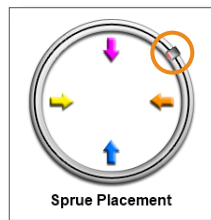
Available block sizes are listed in the Blocks section. A default size is selected. Click on another size if desired. If the restoration will not fit into any of the block sizes available in the chosen material, click **Settings** to select a different material.



Sprue Placement

Change the location of the sprue on the restoration, if desired, by moving the placement indicator (circled in orange below) along the circle that represents the exterior of the restoration or by clicking one of the arrows. Recommended locations are as follows.

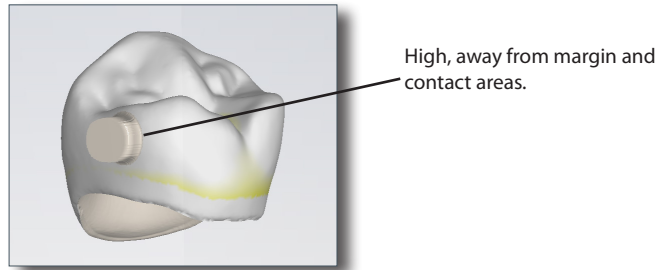
- Anteriors/posteriors: midway between lingual and the mesial or distal
- Premolars: mesial or distal
- Inlays and Onlays: largest proximal box



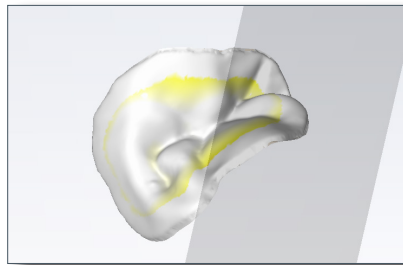
- 1 Restoration
- 2 Sprue
- 3 Mandrel

The sprue is the connection between the restoration and the mandrel.

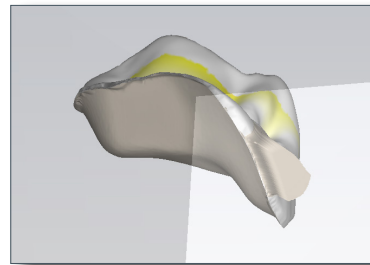
Rotate and inspect the restoration to ensure the sprue is not positioned on a groove. Move the sprue towards a flatter area of the restoration. This is usually near the interproximal, but should not be put on the contact area unless it is necessary. It must be a full round sprue, at an angle never straight buccal and never straight lingual. Placed away from the margin. If you need a smaller block option try a straight inter-proximal placement



Take care in positioning the sprue on inlay and onlay restorations. Ensure the sprue is not attached to an upper surface unless it is an occlusal only inlay. If the sprue appears to be missing, then it is on an interior surface. Try moving the sprue to a new position. Do not mill a partial sprue if another position with full sprue is available. Your orientation affects the position of the sprue.



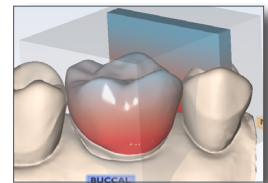
No sprue visible - it is on the interior surface. Change the position of the sprue.



Partial sprue - Change position to allow a full sprue when possible.

Restoration Positioning

When using an IPS Empress CAD Multiblock, the **Restoration Positioning** arrows are enabled. Use the arrows to move the restoration up or down within the block to achieve the desired shading. Be aware that if the restoration is near the top or bottom of the block, extra milling time will be required to remove the extra material.



Mill Simulation

The Simulation Mode portrays the milled restoration. It takes about 10 seconds to generate and is recommended before milling to check the internal fit.

- 1 On the Mill tab, click **Sim** (located under Send to Mill).
- 2 Confirm the desired setting:
 - **Standard** is recommended for full coverage restorations.
 - **Detailed** is recommended for partial coverage restorations.
- 3 Click **OK**.



The system takes a few seconds to create the simulation.

IPS e.max ZirCAD Simulation and Milling

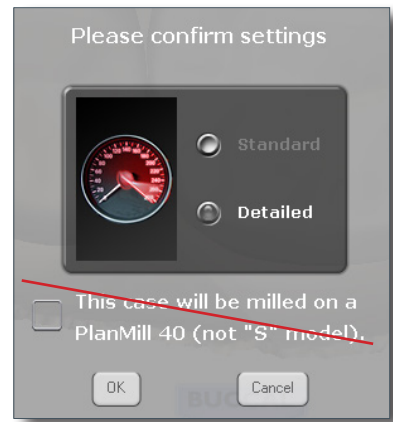
There are a few differences to be aware of on the Mill screen when simulating IPS e.max ZirCAD.

A reminder appears as you enter the screen - **Perform a Sim to ensure inner surfaces are cleared out. For bridges, ensure connectors are above minimum area requirements for strength.** Click **OK** to continue.

Detailed milling is the only option when using this material.

Do NOT activate **This case will be milled on a PlanMill 40 (not "S" model)** checkbox when you do a simulation. This is for older mill models.

See "Milling Zirconia" on page 11 and "Zirconia Mill Maintenance" on page 19 for more information on milling zirconia.

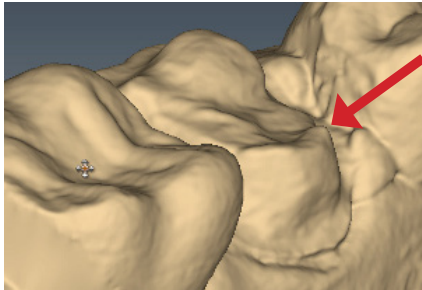


Evaluate the Simulation

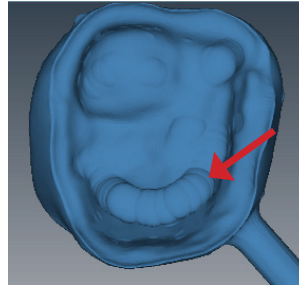
Is there overmilling? Overmilling is caused by areas of the preparation that are smaller than the tools. The tools must "overmill" and remove extra material so that there is no hangup. Is the overmilling drastic enough to cause a loss in retention?

1 Click the **Gingival** arrow to view the interior aspect of the proposal.

The simulation will show swirl marks in areas where the milling tools have to overcompensate for small prep areas.



Sharp areas of the preparation that are smaller than the milling tools can result in overmilling.



Swirl marks indicate overmilling. The rest of the proposal's interior is relatively smooth.

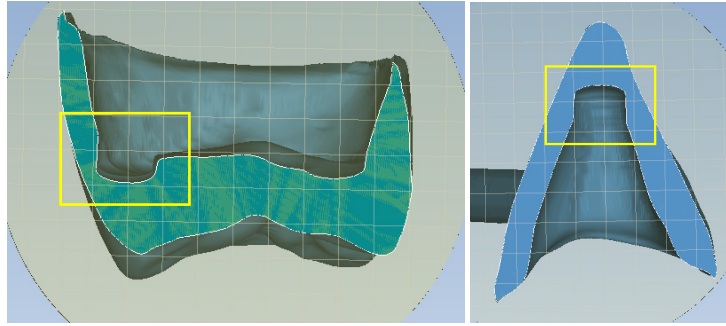
2 Click **Slice Plane** once or twice to get the desired slice direction.

3 Drag the slice to the approximate area of the overmilling. Rotate and zoom to evaluate.

A maximum zoom of 1 mm is recommended.



When overmilling has occurred, you can see the shape of the tool in the slices. Look for straight walled indentations as shown below.



Is there too much overmilling? Has the material become too thin? You can try another simulation with the Detailed mode (smaller bur). If there is a problem, corrections must be made to the design or spacer in your design software. Reimport after corrections have been made.

Evaluating the Connectors on Bridges

It is important to evaluate the connections on the bridge.

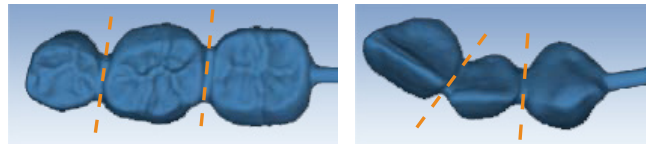
The sprue will be on the mesial or distal side of the bridge.

- 1 Click **Sim.**

When the Simulation is run, the connections between the teeth are displayed.

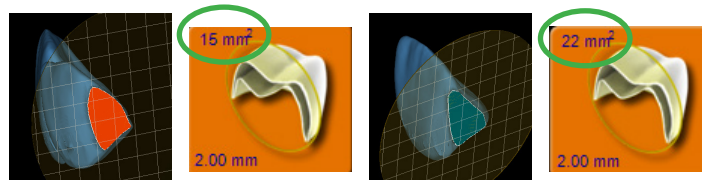
- 2 Click **Slice Plane** twice.

When Slice Plane is activated on a bridge mill simulation, the system measures the slice width. If the slice is thinner than the material guidelines, the slice displays as red. It is important to slice the simulation through the thinnest part of the connectors (orange lines in the examples).



Posterior cases tend to have wider contacts with smaller embrasures and are unlikely to be thin. Anterior cases have smaller contacts and larger embrasures. Any thin area should be evaluated.

- 3 Move the Slice Plane to a connector. If the Slice Plane needs to be rotated to slice through the thinnest part, hold down the **Ctrl** key while moving the mouse to rotate.
- 4 Rotate the model to view the slice.
- 5 If the slice is red, adjust your embrasures and/or contacts in your design software, reimport, and try the simulation again. Note that when the model is hidden, the Slice Plane icon displays the mm² area.



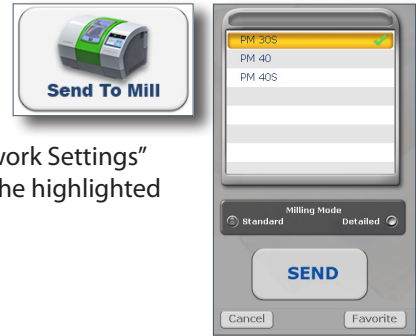
Minimum required thickness:

- Telio CAD - 12 mm²
- IPS e.max - 16 mm²
- IPS e.max ZirCAD - 7 mm² (anteriors), 9 mm² (posteriors)

- 6 Click **View Model** to activate it.
- 7 Click the **Gingival View Control** arrow to view the model from underneath.
- 8 Look for mill simulation issues.

Send to Mill

- 1 Click **Send to Mill** when you are satisfied with the restoration and mill set up.
- 2 If you have multiple mills, select the desired mill from the list. See “Mill Network Settings” below for how to create/edit this list. Use the Favorite button to designate the highlighted mill as the default. The favorite mill is always at the top of the list.
- 3 Confirm the desired setting.
 - **Standard** is recommended for full coverage restorations.
 - **Detailed** is recommended for partial coverage restorations.



Detailed mode is not recommended for e.max c14 blocks and may result in broken tools.

	Crown	Bridges	Inlay	Onlay	Veneer
I-12	Detailed	Standard	Detailed		
C-14	Standard		N/A		
C-16	Standard				
IPS e.max ZirCAD	Detailed	Detailed			

Mill Tab Settings

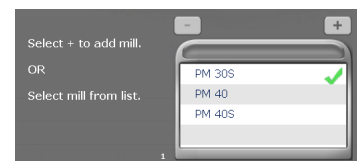
Click **Settings** to change any of the settings listed below.



Mill Network Settings

If you have multiple mills on your network, you can set them up here.

- To add a new mill to the network, click the Plus sign in the top right then type the Mill Name and IP Address.
- To edit one of the mills, click the name in the list and edit the details on the left.
- To remove a mill, click the name in the list and then click the Minus sign in the top right.



Material/Shade Settings

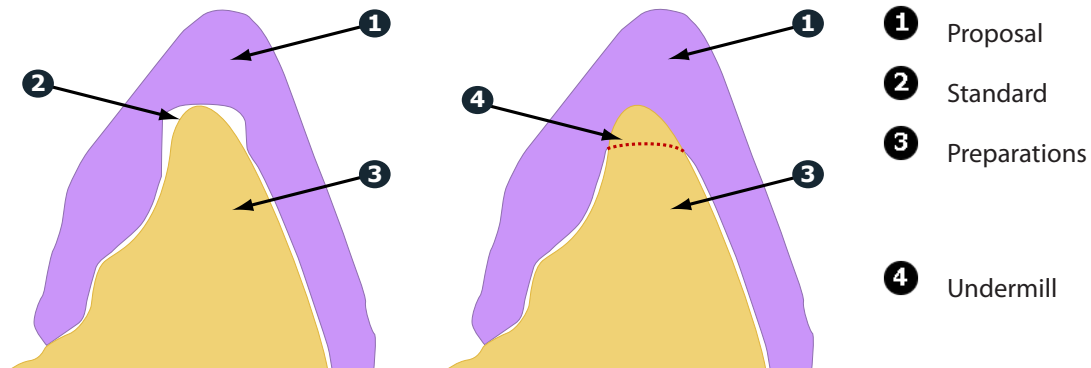
The material and shade for the current restoration can be changed here.

Margin Thickness Settings

[PlanCAD systems only]

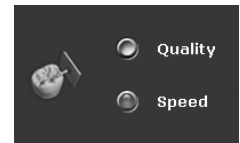
Milling Settings

Milling Settings only affect proposals with a sharp interior angle, like an anterior incisal edge. If the interior of the proposal is smaller at the tip than the tools in the mill, the **Standard** setting removes extra material at the tip. This may lead to a crown that is too thin at the top. The options are to round the preparation or to select **Undermill**. If **Undermill** is selected, then the mill will go as far as the tool's size will allow and the remainder must be removed manually.

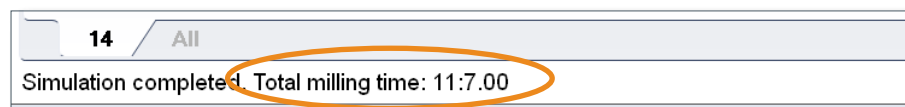


Simulation Settings

Click **Settings** on the Mill tab to view/edit the **Simulation Settings**. The default selection is **Speed**. This will give you a faster simulation. Select **Quality** for a more accurate simulation, but be aware that it will take longer to process. Note that when the design software is restarted, it will return to the default Speed setting.



Mill time is displayed in the information when Quality simulations are processed.



Mill System Specifications



The components use standard electrical current and do not need to be attached to a water supply or drain.

Model Number: Mill	PlanMill 40 S
Electrical Ratings:	100-240 Vac, 1000 W, 50-60 Hz
Air Requirements:	50 - 130 psi, minimum 2 cfm, filtered, dry air
Data Connection Requirements:	Cat5 Ethernet cabling
Storage conditions	-4°F to 140°F (-20°C to 60°C) 5% to 95% RH "non-condensing"
Operating conditions for E4D equipment	Indoor use only 41°F to 104°F (5°C to 40°C) Transient overvoltage category II per IEC 60364 Maximum altitude 6,562 ft (2,000 m) Maximum 80% non-condensing relative humidity for temperatures up to 88 °F (31 °C) Pollution degree 2
Dimensions:	17.5 in. (445 mm) tall x 26 in. (661 mm) wide x 20 in. (508 mm) deep
Minimum Clearance	Sides: 2 in.; Rear: 1 in.; Top: 12 in.
Weight:	170 lb. (77 kg)

Applicable Standards

Electrical and Mechanical Safety	UL 61010-1:2015, 3rd Edition CSA C22.2 No 61010-1:2012, 3rd Edition IEC/EN 61010-1:2010, 3rd Edition
EMC	IEC/EN 61326
Packaging and Environmental	ISTA 3 Series
Additional Standards	ISO 14971:2007 EN ISO 14971:2012 EN ISO 13485:2012 ISO 13485: 2016 European Directive <ul style="list-style-type: none">• 2006/42/EC for Machinery• 2004/108/EC for EMC• 2002/96/EC for WEEE• 2011/65/EU for RoHS












Approvals

North America	Product Safety Mark (NRTL) - UL C/US
International	CB Scheme Test Certificate (UL)
Quality System Certifications	ISO 13485 Registered Firm Japan GMP

Labels

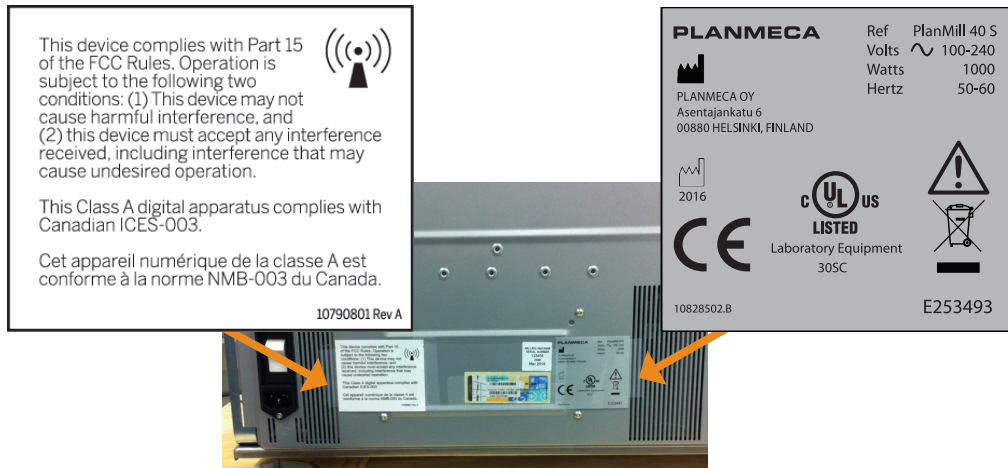
Symbols

The following symbols are used on various labels on the system.

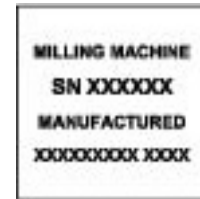
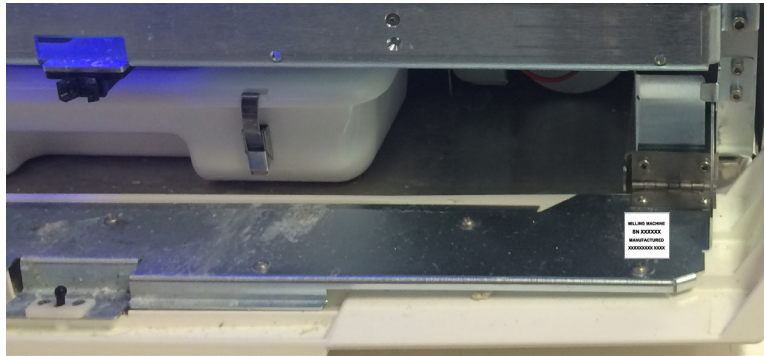
Symbol	Definition
	Alternating Current IEC 60417-5032
	Caution: ISO 7000-0434A
	Date of Manufacture
	This product must NOT be disposed of with other waste. It is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to E4D Technologies for reprocessing. For more information about where you can send your waste equipment for recycling, please contact your local city office or E4D Technologies.
	Manufacturer
	OFF Power IEC 60417-5008
	ON Power IEC 60417-5007
	On/Off Power IEC 60417-5010
	Operating Instructions ISO 7000-1641
	Protective Earth IEC 60417-5019
	European conformity

Product Identification Labels

Affixed to the Mill are product identification labels that contain identification and safety information. Be certain to read all product labeling.



The serial number is located above the tank.



If any of the labels are missing or illegible, please contact Planmeca Customer Support for replacement labels.

Label examples are not shown actual size. The labels may have changed since this book was published.

Attention Labels

Attention labels are located in numerous places on the E4D components. These labels direct you to specific safety entries in this user manual. Adhere to all such safety warnings at all times.



External Components and Connectors

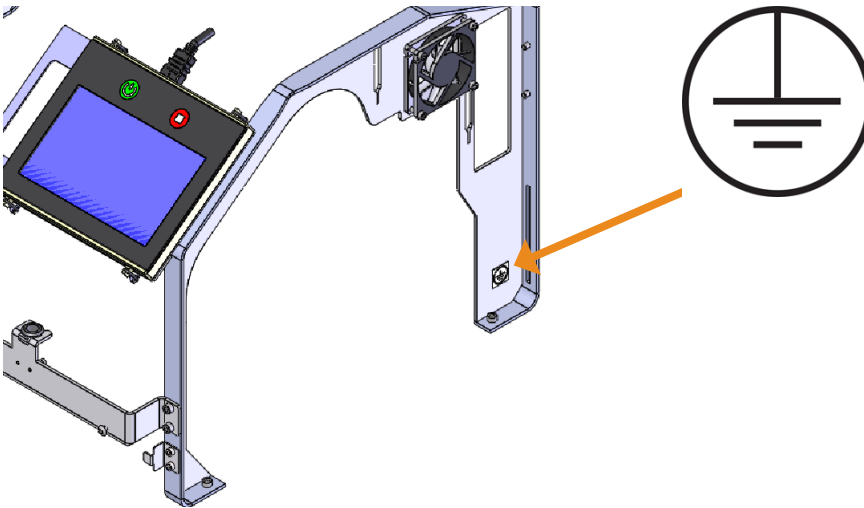
When connecting external components to the E4D system, attach only components that have been tested for compliance with IEC 60601-1 or UL 60950.

Connectors for attaching external devices conduct low voltages. Avoid touching the connector pins.



Protected Earth Ground Label

The Protected Earth Ground label is attached to the Mill under the cover as shown.



UL Listing:

UL Laboratory Equipment Listing

IN ACCORDANCE WITH UL 61010-1

30SC

E253493

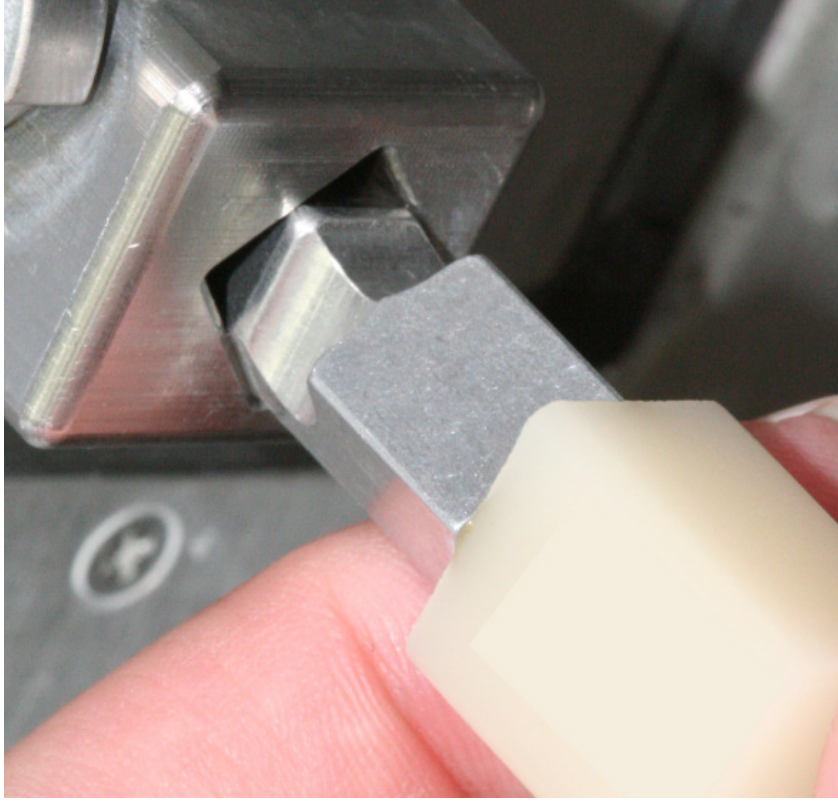


Tear Out Sheets

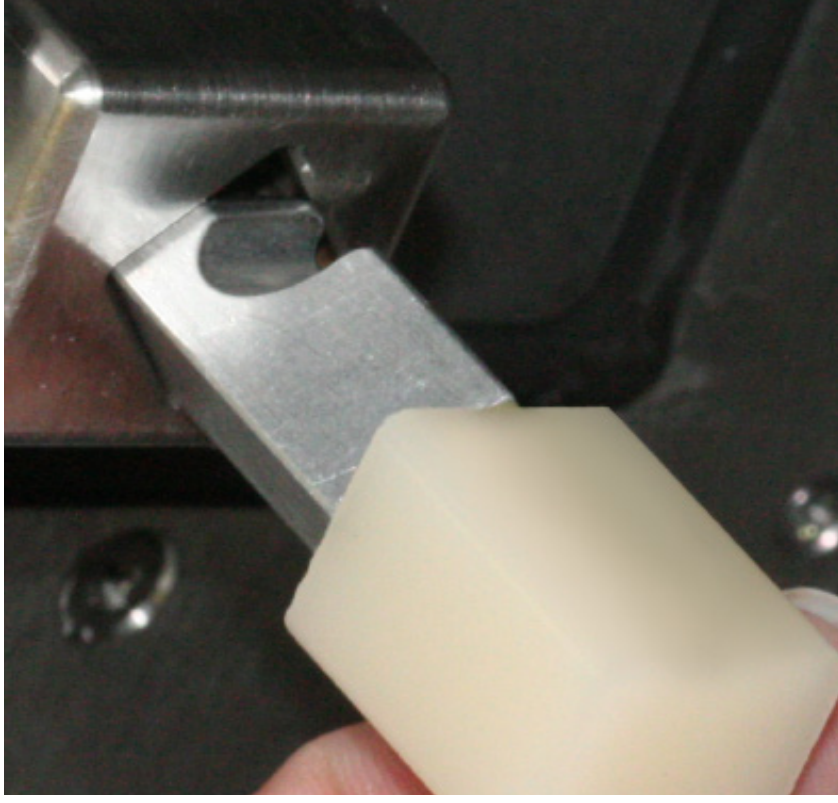
The following pages are intended as removable pages for copying or reference to put near your machine(s).

Block Orientation

Horizontal Orientation
Notch points to the top right



Vertical Orientation
Notch points to the bottom right



**To minimize confusion, the pictured blocks do not show labels.
Position of labels may change from one lot of blocks to the next.**

NOTE: Keep this document for your records

_____ MONTH 1

Week 1	Week 2	Week 3	Week 4	Week 5
Water				
Strainer				
Collets				

_____ MONTH 2

Week 1	Week 2	Week 3	Week 4	Week 5
Water				
Strainer				
Collets				

_____ MONTH 3

Week 1	Week 2	Week 3	Week 4	Week 5
Water				
Strainer				
Collets				

_____ MONTH 4

Week 1	Week 2	Week 3	Week 4	Week 5
Water				
Strainer				
Collets				

Daily Procedures:
 Check tool wear
 Turn OFF the mill
 Wipe the milling chamber dry
 Clean debris from chamber
 Leave the lid open

Weekly or 3hrs Milling:
 Clean water tank w/warm water
 Dry internal mill areas
 Clean floats & strainer
 Replace fluids (water, coolant)

Every 2 Weeks or 9hrs Milling:
 Clean spindle caps (left & right)

Every Month or 18hrs Milling:
 Clean collet & collet shafts*

*verify all internal aspects have been thoroughly cleaned

QUESTIONS?

Contact Support @ 800.537.6070

NOTE: Material types and heavy use will increase the maintenance frequency!