



PROCAM CNC

USER MANUAL



Proudly manufactured by

PROCAM CNC

35 Furniss Road

Landsdale 6065

Western Australia

Ph ++61 8 93022850

Fax ++61 8 93022846

Email doug@procamcnc.com.au

Visit our web site at www.procamcnc.com.au



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Safety Procedures

Before operating a ProcAM CNC router it is important to understand the safety aspects of using a CNC machine.

The basic day to day operating instructions are outlined in this manual. However we cover certain factors in this chapter which we consider are paramount to the safety of the operator and personnel working around the ProcAM CNC router.

- Never operate machinery while under the influence of alcohol or drugs. This includes painkillers and anti depressant prescription medication.
- Always wear ear and eye protection while operating this equipment or working within the vicinity of this equipment.
- Never remove any guards or safety equipment attached or supplied with this equipment. It is there for a reason.
- Never make adjustments to this equipment while the equipment is running. This could result in serious injury or loss of life.
- The area surrounding this equipment must be kept clear of debris at all times to prevent accidental tripping into the working machine.
- The area surrounding this equipment must be demarcated with a Yellow boundary and a sign indicating that the area within the demarcated area is a no-go area to anyone other than the operator without the express permission being given by the operator.
- Never operate this equipment without the dust extraction unit turned on. This will cause swarf particles to become airborne and can be hazardous to health and will have a potential explosion risk.
- Always keep hands and limbs clear of this equipment at all times to avoid potential injury.



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START UP

Switch on the power and make sure that the compressed air is connected. Wait for the control to boot up and follow the on screen prompt. The prompt will read "MACHINE NOT HOMED - PRESS CYCLE START".

The referral to Home here means that the machine has not been CALIBRATED and should not be confused with the term HOME later in the manual which is the "Ready to Load" position.

Do so and the machine will calibrate automatically.

Never jog the machine before the machine has been homed! It is possible to crash the machine into the end stops and cause damage to the machine. After homing the machine can be jogged around without fear of crashing. The software has built in hard clip limits and will therefore not travel outside of the designated area. The factors influencing jogging are as follows:

1. INC/CONT button: This button selects whether the machine will move by increment or in the continuous mode. Should you select the INC mode the machine will move by a small increment each time the axis button is pressed. In the CONT mode the machine will move in the selected direction as long as the jog button is held down.
2. Rabbit/Tortoise mode: The machine will move at the max jog rate when the Rabbit mode is selected and at the min jog rate when the snail mode is on.
3. The Axis Buttons: Press one of the axis buttons and the machine will move in the direction indicated on the button. E>G> Press x- and the machine will move in the X- direction either in continuous or Incremental mode depending upon which mode has been selected.
4. 1X 10X 100X Buttons: When in the Incremental mode the step by which the machine will move is determined by these buttons. For example if the 100X button is selected and then the x+ button is depressed the machine will move 100X this increment distance (.001) mm



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SETTING UP NEW TOOLS

Place tools into the spindle by pressing the Green Release button located on the side of the Spindle. Insert the tool holder and make sure you press the taper as hard as possible into the spindle : Now release the green button. Give the tool holder a spin by hand to ensure that the tool is correctly inserted before continuing with the job.

You will now need to perform an auto tool length sense routine. Refer to TOOL LENGTH OFFSETS on page 5.



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Replacing Tool In Collet Chuck

To replace a broken or worn tool in the collet chuck the procedure is as follows.

If you have pressed TOOL CHECK while running a job in order to replace the worn or broken tool refer to the chapter on TOOL BROKEN OR WORN.

Make sure that the spindle has stopped before attempting to remove the tool from the spindle. Lift the Dust Extraction foot into the Up position and lock it in place. Grip the collet chuck firmly in your right hand while pressing the Green release button with your left hand. The chuck will be ejected from the spindle.

Place the collet chuck into the tool-loading jig provided. Now, using the special spanner issued in the tool kit, undo the circular nut on the chuck. The nut will undo by about 1-½ turns and then tighten up again. This is normal. Undo the nut until the cutter is loose enough to remove. Take care not to cut yourself on the sharp edges of the cutter while changing tools.

Be sure to REMOVE the nut and collet from the chuck and use an air gut to thoroughly clean all the dust from the collet chuck and collet/nut assy. The reverse procedure is used to replace the tool. Make sure the chuck is tight enough otherwise the tool may come loose while cutting and damage the machine.

Put the collet chuck back into the spindle as per the chapter SETTING UP NEW TOOLS.

Now you will need to RE-Sense the tool as per the tool length-sensing chapter.



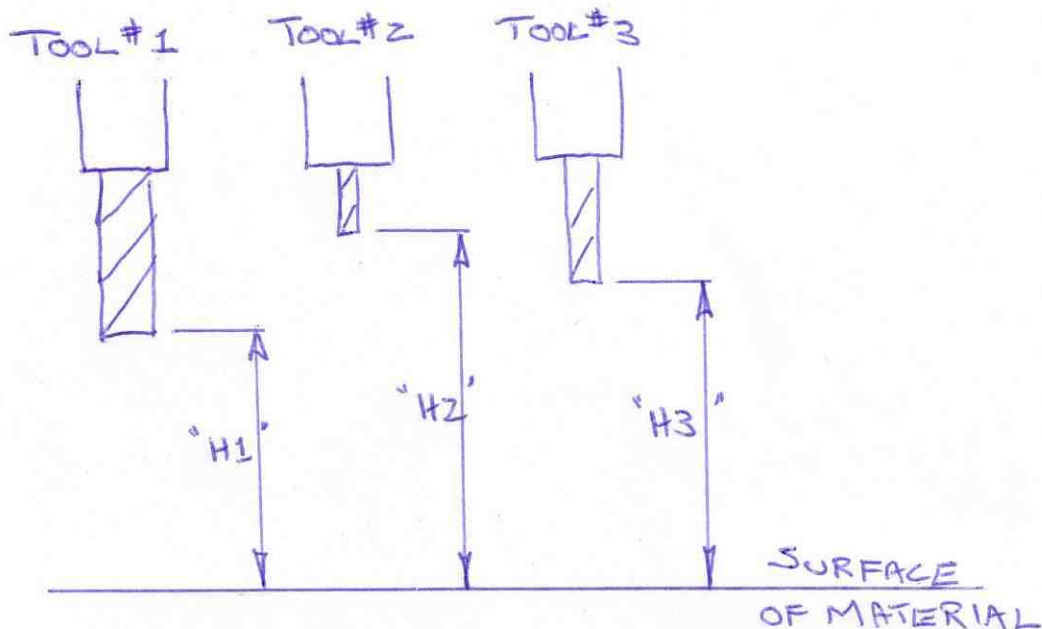


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TOOL LENGTH OFFSETS (G43)

As you will see all of the tools you will be using are of different lengths. It is therefore going to be a rather difficult task programming the “Z” values for each tool, as you will have to calculate the true “Z” position for each move.

To overcome this we use a tool length offset “G43”. Each tool is measured and the value recorded as the “H” value for that particular tool. When using the tool we call up the offset on the first “Z” move and the control will remember this value and add it to each “Z” move until such time as the program cancels the offset or a new offset number is called up.



Now that you have a good understanding of how offsets work we can go on to **Tool Length Sensing.**



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TOOL LENGTH SENSING

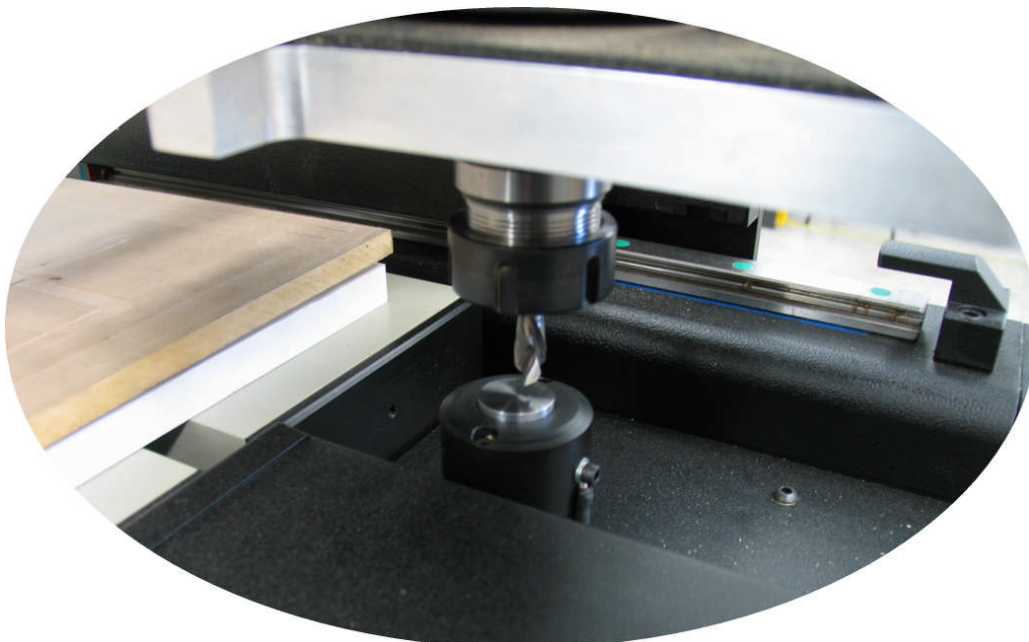
The PROCAM CNC has a built in automatic tool length measuring system called a TT1 sensor.

From the control soft keys:

- Select SETUP (F1)
- Select TOOL (F2)
- Select the tool number corresponding to the tool number in the spindle. (Use the up-down arrow keys.)
- Select AUTO MEASURE (F3)
- Press CYCLE START

The machine will automatically position over the tool sensor and measure the tool length for the chosen tool.

Now simply press the “F10” key to save the new offsets. Now press “esc” to get back to your operating screen and you are ready to cut material.





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For Sensing tools which are Bigger than 25mm Dia.

Firstly you need to change the position at which the machine will sense the tool.

- 1 Press "Set Up"
- 2 Press "Part"
- 3 Press "WCS" (F9)

- 4 Select "Return"
- 5 Select "G30"
- 6 Change the setting for the "**X**" axis by -20mm. For example if the setting is X 130mm then change this to X 110mm and hit F10 to save.

Now sense the large diameter tool just as you would a normal tool. (See above page 7)

Once you have sensed and saved the new value for the large tool go back to step 1 and change the G30 position for X back to X 130mm.



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TOOL BROKEN OR WORN

Should you have a broken or worn tool in the spindle the procedure is as follows:

IF THE MACHINE IS IN CYCLE.

First press "TOOL CHECK" on the jog panel (or the RED button as shown if you do not have a jog panel) to make sure that the spindle has stopped turning and that the "Z" axis is at the home position ([refer to 'send axis home'](#))

Lift the dust foot all the way up to the maximum height and tighten the locking collar so that the dust foot stays in the up position.

Hold the collet chuck in your right hand and carefully press the green button located on the left side front of the spindle. The tool will release with a slight thump. Release the green button and attend to the broken or worn tool (refer to 'replacing tools in collet chuck')

Replace the collet chuck into the spindle by first pressing the green button for tool release and then while holding the button in carefully push the collet chuck as far as possible into the spindle. Make sure that the taper on the collet chuck is clean before starting. Release the green button and when sure that the tool is tightly held in the spindle you can let go of the tool.

You will notice that the Press Cycle Start message is flashing. This indicates that the machine is still in CYCLE and waiting for you to continue. The problem is that you have NOT yet re-sensed the new tool and the machine has no idea of the new tool length. You have to sense this tool.

- Press **Offset Lib (F2)**
- **Highlight the tool number corresponding to the tool in the spindle.** Then press **Auto Measure (F3)**
- Press Cycle start. The machine will automatically re-sense the current tool.
- When the cycle is complete press F10 to save. Lower the dust foot and you can now press cycle start to continue machining exactly where you left off.



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If the machine is stopped.

Refer to the chapter on **Replacing Tool In Collet Chuck**

Re-Start the job

To re-start the job at the beginning of a certain tool.

1. Press F4 "Run"
2. Press F2 "Search"
3. Type in the tool number. E.g. T4 for Tool Number 4.
4. Press Enter
5. The control will look for tool number 4 in the program. When this has been found the program line with T4 will be displayed on the top line of the screen.
6. Press CYCLE START to re-commence machining.

Emergency Stop

This is exactly what it sounds like, **EMERGENCY**. Do NOT use the Emergency stop button for anything other than an emergency. If you have depressed the E-Stop button for any reason, you will have to twist the button to release the E-Stop condition and then press TOOL CHECK before doing ANYTHING else.



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LOADING A NEW PROGRAM

The method for loading a new program is outlined in this chapter.

A program can be loaded in two ways depending on the configuration of your machine.

The standard way of loading a program is as follows:

Press the F2 key.

The machine will prompt you to select which drive the file is on. E.g. USB or C:/ (Hard drive).

If the program you wish to load is located on the USB drive select the drive using the down arrow key and hit enter. The USB display will move to the top of the selection screen. Press Enter again and the files on the USB will be displayed. Using the arrow keys select the file you want to run and hit Enter or F10 (Accept).

The last program run will have been replaced automatically. You are now ready to run the new program.

The second option is to load a file from a remote computer. This option needs to be set up by your local PROCAM Dealer. He will then instruct you as to how the files can be up loaded from a host computer.

Always graph your job before running it. This will avoid costly mistakes like cutting into your vacuum table.

Other machines don't have this feature. Your Procama machine has safety features built in, **USE THEM**.

- Press Graph (F8)
- Press View (F2)
- This will show you an end view of your job and if the cut is too deep this will show up on the screen.



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DELETING FILES:

Once you have run ALL the files through the Procama CNC Nesting Centre you can delete these files from the CNC hard drive.

- Select **F7 “Utilities“**
- select **F5 “File Ops”**
- Select the drive from which you are Deleting. This will be “C:\CNC10\Ncfiles” if you are using the hard drive.
- Toggle (F1) on each of the files you want to delete. This will add a * to the file name to show that it has been selected.
- Press the F9 “DELETE” key and **ALL** the selected files will be removed.
- **There is no OOPS button here so be carefull!!!**

TO SEND ALL AXIS HOME

Home is the position on the machine where the machine will stand ready for you to load a sheet onto the table.

Simply press the MDI button (F3) and type “G28” press cycle start and ALL of the Axis will go to the Home position. First the Z axis and the X and Y axis will simultaneously move home.



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Procam Automatic Toolchanger

THIS IS THE MOST IMPORTANT SECTION IN THIS MANUAL!!!

Make sure you understand this FULLY.



The Toolchanger on All Procam CNC Routers has been designed and programmed to work faultlessly and safely time after time. The only time anything can go wrong is when there is human intervention.

The type of intervention that can happen is that the operator cancels the toolchange cycle by hitting Esc, Emergency Stop or Cycle Cancel during the toolchange cycle, if the operator removes the tool from the spindle and puts it back into the tool rack, or if there is a power cut or loss of compressed air to the machine.

If these faults occur and are ignored or overlooked by the operator this WILL result in SEVERE damage to the machine and will not be covered by your warranty. If there is even the slightest doubt in the mind of the operator as to the status of the toolchanger, then use the “Toolchange Recovery” button AUX 10. This will return the machine to a “NO TOOL IN SPINDLE” state.

There are sensors built into the toolchanger which will not allow the toolchange cycle to continue if the tool rack is not up when it should be and vice versa.

If your car comes up to a red traffic light it won't stop on its own, nor will the machine stop if you have messed up the toolchange cycle.



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GOLDEN RULES

1. Never remove the tool from the spindle manually.
2. Don't hit E-Stop unless it is an **emergency**.
3. Don't stop the program cycle unless you are 100% sure that the toolchange cycle has completed. Once the spindle turns on and the machine starts to move to the first cut position, the cycle has finished.
4. Don't share compressed air with air blowers or dust guns elsewhere on the shop floor. This will cause a drop in air pressure and will generate an E-Stop fault. If this happens during a toolchange you will have a situation where the toolchange has been interfered with.
5. Don't expect tech support to believe that the tool rack "Just stayed up" while cutting as this is NOT possible. There is a fail safe built into the toolchanger and basically if you don't mess with it, it won't mess with you!



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TOOLCHANGER OUT OF SEQUENCE

THIS IS THE MOST IMPORTANT SECTION IN THIS MANUAL!!!

If you have any doubt as to the status of the tool changer, follow this routine exactly. If you don't follow this you WILL damage your machine and this will not be covered under warranty!

Should you strike the E-Stop Button while the tool change sequence is in cycle, or the power should be cut to the machine, or you loose compressed air, the routine for getting the system back into order is as follows:

Release the E-Stop button.

Press the AUX10 key and the machine will display the message:

*** WARNING ***** WARNING *** WARNING

“YOU ARE ABOUT TO RECOVER FROM A TOOLCHANGE ERROR”

“PRESS CYCLE START WHEN READY TO RECOVER”

“FROM OPERATOR TOOLCHANGE ERROR”

After pressing CYCLE START the machine will Lift up in the Z axis and reset the internal parameters.

The machine will Display.

REMOVE TOOL FROM SPINDLE IF NESSASARY
 *** REPLACE TOOL IN TOOL RACK ***

PRESS CYCLE SATRT WHEN YOU HAVE FINISHED



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- If the tool is in the spindle, firmly grip the collet chuck and press the GREEN button located on the side of the spindle. This will eject the tool. Now put the tool back into the correct tool pocket.
- The Machine will display:

“PRESS CYCLE START IF YOU ARE 100% SURE THAT YOU HAVE RECOVERED FROM TOOLCHANGE”

“IF YOU ARE NOT SURE THEN PRESS ESC AND THEN THE AUX KEY AGAIN”
- Simply press CYCLE START to continue with the job you were cutting.

DO NOT REMOVE THE TOOL MANUALLY FROM THE SPINDLE AND RETURN IT TO THE TOOL POCKET WITHOUT FOLLOWING THIS SEQUENCE!



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Instructions to Re-Skim the Sacrificial Board

The value of parameter 71 will determine the initial thickness of the sacrificial board. This **must only** be set by a Procam Technician.

Once the board has been used to the degree that you feel that there may be part movement it is time to re-surface the sacrificial board.

TO SKIM A NEW SACRAFICIAL BOARD

Once the sacrificial board is too thin to use, throw it away and replace it with the new board of the same thickness you have been using in the past.

Press the SKIM NEW button on your Jog Pendant and turn on the dust extraction and vacuum hold down. Press CYCLE START.

The control will give a prompt:
(DO YOU WANT TO SKIM A NEW SACRIFICIAL BOARD?)
(IF SO PRESS CYCLE START IF NOT PRESS ESCAPE)

This will re-set your Z height to the standard setting for your new sacrificial board thickness and skim .5mm off the surface.

TO SKIM AN EXISTING SACRAFICIAL BOARD

Press the SKIM OLD button on your Jog Pendant and turn on the dust extraction and vacuum hold down. Press CYCLE START.

The following prompt will appear:
(DO YOU WANT TO RE-SKIM THE SACRIFICIAL SHEET?)
(IF SO PRESS CYCLE START IF NOT PRESS ESCAPE)

By pressing CYCLE START the Z heights will automatically be set to 0.5mm lower, the vacuum and dust extraction will come on automatically and the table will be skimmed.



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SHUTDOWN PROCEDURE

- 1 Press the “MDI” Key. (F3)
- 2 Type in X0 Y0
- 3 Press Cycle Start or “Alt-S”

This will park the machine ready to switch off.

- 4 Press Emergency Stop.
- 5 Press F10 (Shut Down)
- 6 Press F2 (Power Off)
- 7 Wait for the control screen to run through the shut-down sequence and on completion switch off the machine at the main isolator.

Under no circumstances should you simply cut the power to the machine by switching off at the rotary isolator.



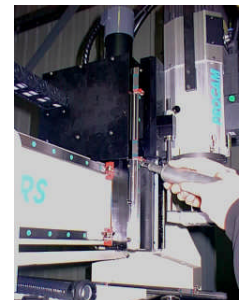
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Routine Maintenance

It is required to lubricate the linear bearings from time to time. The frequency would be dependent upon the usage of the machine. Generally the linear bearings should be greased every 50 hours of use. Use CALTEX EP C2 grease as shown.

The procedure for this is as follows:

With the machine in the HOME position (farthest away from the control) and the Z axis jogged at least 100mm down from HOME, turn the speed control down to the slowest speed. Press the PARK button. The machine will move toward the home position slowly. While the machine is moving squeeze grease into the linear bearing grease nipples allowing the grease to circulate with the balls inside of the bearings. Do this for ALL the bearings on the X and Y axis. Allow the machine to continue on to the park position.



Jog the Z axis down about 150mm. With the speed control at the slowest speed, press TOOL CHECK. This will send the Z axis to the home position. Grease the 4 bearings on the Z axis while the machine is homing. Now Jog the Z axis down as far as you can and using your finger, poke it through the protective brushes behind the Z axis Spindle. There is a ball screw in there. Put some grease on your finger and apply the grease to the ball screw.

Along the top of the Y axis beam is a length of Precision Rack. Approx every 250mm squeeze a blob of grease onto the teeth of the rack. Do the same thing along the X axis rack which is located under the side beams. After a while the machine will throw off the excess grease. Wipe this off in order to keep the machine clean.