

OVERVIEW

In this module, you will learn how to operate the waterjet machine effectively and efficiently. The module will guide you through the necessary steps before starting, including file setup in Protomax LAYOUT, checking the machine setup, and ensuring proper material clamping. You will also be introduced to the observation and troubleshooting techniques during the cutting process, such as monitoring for loose pieces, collisions, and clogged nozzles. Additionally, the module provides instructions for post-cutting tasks, such as cleaning the machine, checking the drain tank, and performing maintenance procedures. Make sure to refer to the Protomax Help materials for detailed instructions and follow the guidelines closely for a successful waterjet operation.



Check Before Start

- USB cable is connected to laptop
- Drain tank filter is not clogged
- Nozzle is clean

File Setup

- Import given file into Protomax LAYOUT program
- Measure to make sure scale is correct
- Clean the geometry (button on right-hand toolbar)
- Use AutoPath tool to generate a path
- Post it to generate an OMX cut file (for Protomax MAKE)
 - Click Post button on right-hand toolbar
 - Click near the beginning of the line that should be the starting point for the cut
 - Make sure kerf is on the expected side of the geometry
 - Click Check for Problems; Minimize potential collisions



Machine Setup

- a. Turn on machine
- b. Start Protomax MAKE program
- c. Home the machine (click red notice in MAKE)
- d. Start filling the tank
 - To just below top of cutting bed
- e. Click Change Path Setup (load cut file) and set
 - Material type
 - Thickness (measure with calipers)
 - Ensure Tool Offset is set to .015

f. Insert nozzle (aka mixing tube) into nozzle assembly

- Secure by hand with thumb wheel
- Tighten with torque wrench (until click/bump felt)

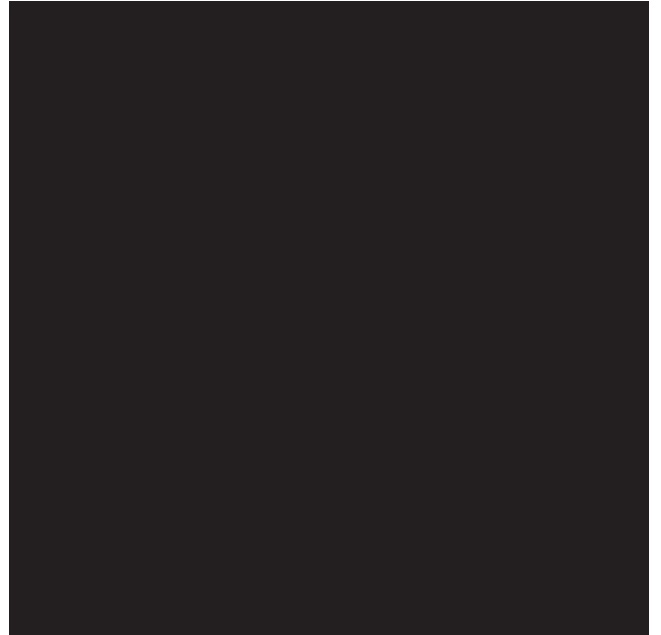
g. Move nozzle head over one of the holes in the bed

- Lower the nozzle to bed to help adjust
- Use arrow keys on computer to move head
- Clear abrasive tube should remain unattached
- Close lid



h. Run test cycles

- Click Test, select Test Cutting Head, click Next
- Confirm water is flowing out of nozzle
- Test will continue until stopped
- Insert clear abrasive tube into port on side of nozzle assembly
- Repeat Test Cutting Head cycle
- Observe abrasive is flowing through the clear tube
- Raise nozzle

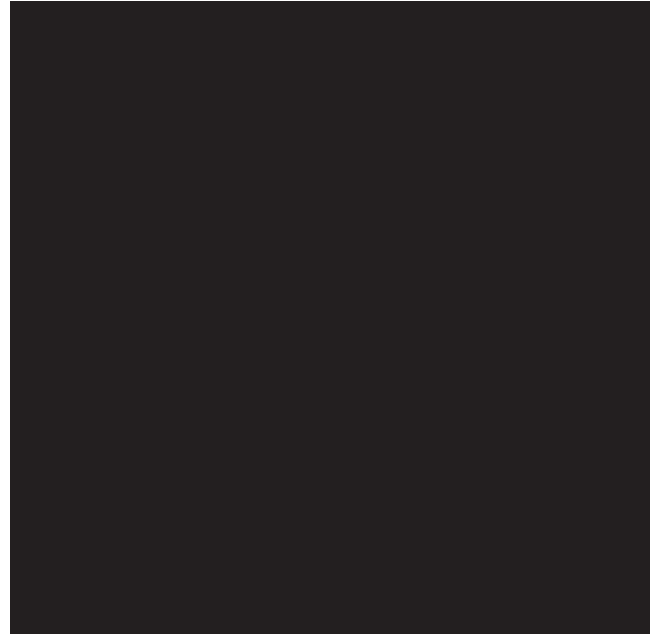


i. Place stock material onto bed

- Clamping
- At least 2 locations
- Make sure it cannot move or wobble

j. Choose a Path Start location

- Set it clear of the clamps
- Also account for splash guard clearance
 - i. Use Dry Run to check clearance
 - Click Begin Machining
 - Right click on Start button and select a dry run option
 - Be prepared to click Pause in case of collision
- Set Path Start by clicking second Zero button



i. To the left of the Distance to "Path Start" readouts

k. After dry run return to home

- Click second Go Home button



l. Place splash guard onto nozzle

- It should be facing down when attaching
- Flip splash guard up



m. Set nozzle height for material

- Use metal offset for 1/16" distance from material
- Flip splash guard down



n. Place abrasive catches on their appropriate sides



o. Raise water level to a 1/4" over the material

- Use metal offset tool on its side
- Make sure drain tube is set at desired water level
- Once filled remove metal offset tool



p. Double check abrasive level fill if needed

- Check abrasive required if above 3lbs; if so note how much for billing for purposes

q. Close lid

r. Start cut

- Click Begin Machining
- Click Start

Things to observe during cut

i. Watch for (and Pause cutting if)

- a. Loose pieces
- b. Collisions between nozzle and material or clamps
- c. Collisions with splash guard
- d. Cracking in material if brittle
- e. Clogged nozzle / backflow of water through abrasive tube

- In case of backflow, abrasive hopper must be disconnected, dry abrasive set aside, wet abrasive discarded
- All hopper parts and abrasive tube must be dried using compressed air (protect eyes from airborne abrasive)
- Hopper should be refilled with fresh abrasive
- Test cycles must be re-run (tube detached for first!)
- If nozzle clogged, remove and re-insert upside down, then run test cycle to clear clog, then remove nozzle and reattach in normal orientation
- See Operator Training section in Protomax Help (in MAKE program) for detailed instructions for the above



ii. If you move the nozzle (using arrow keys) while paused to retrieve pieces

a. Move nozzle back near cutting path where it can continue

b. Right click on Begin Machining

c. Click Go To Spot On Path option

- Click on toolpath at a point just before point where cut was paused

d. Click Continue to restart cut



After Cutting

i. Raise nozzle

ii. Lower water level (adjust drain tube height)

a. Check the fabric filter in drain tank behind machine to ensure its not overflowing

- Scrape down sides if overflowing or replace filter

iii. Remove clamps and posts

- Remove T-nuts from posts

iv. Remove abrasive catches

- Clean them out



- v. Remove splash guard
- vi. Remove nozzle
- vii. Remove abrasive tube from nozzle assembly and tuck away end of tube
- viii. Spray down inside of machine
- ix. Check to see if hose is leaking
- x. Shut off machine
- xi. Keep lid open once done



