Compact CNC Routers

A compact CNC router is a computer-controlled milling machine that cuts, engraves and profiles plywood, MDF, acrylic and soft metals by moving a spinning cutter along three axes. It turns CAD geometry into accurate physical parts and is the natural bridge between laser cutting and subtractive machining.

Key Features

- Working area typically 300 x 200 mm to 600 x 400 mm
- Spindle power from 300 W to 800 W for school use
- Ball-screw or belt-driven three-axis motion
- GRBL or Mach3 style controller with e-stop
- Dust shoe with extraction port as standard

Typical Uses in the Workshop

- Cut precise plywood and MDF parts for models and jigs
- Engrave text, logos and details into wood and acrylic
- Mill PCB blanks and enclosures for electronics
- Machine foam and soft plastics for prototypes

Safe Operation

1. Fix stock firmly with clamps or double-sided tape
2. Set X, Y and Z zero carefully with the probe or by eye
3. Dry-run the toolpath with the cutter raised first
4. Wear eye and hearing protection and keep hands clear
5. Watch the first pass before walking away

SAFETY NOTES

- Never reach into the machine while it is running
- Secure hair, loose clothing and jewellery
- Keep the collet wrench away from the spindle area
- Check the toolpath for cuts outside the material
- Extract dust; wear a mask when emptying the bin

Maintenance & Consumables

- Vacuum the bed, rails and controller after jobs
- Wipe and re-oil the linear rails weekly
- Check collet and spindle tooling for tightness
- Replace worn or chipped end mills promptly
- Keep the spindle fan and controller fins dust-free

Specification & Buying Notes

Look for a rigid aluminium frame, a GRBL-based controller, an easy e-stop and a dust shoe. An 800 W spindle with ER11 collets is more versatile than a trim router. Budget for spare end mills and a sound guard or enclosure.