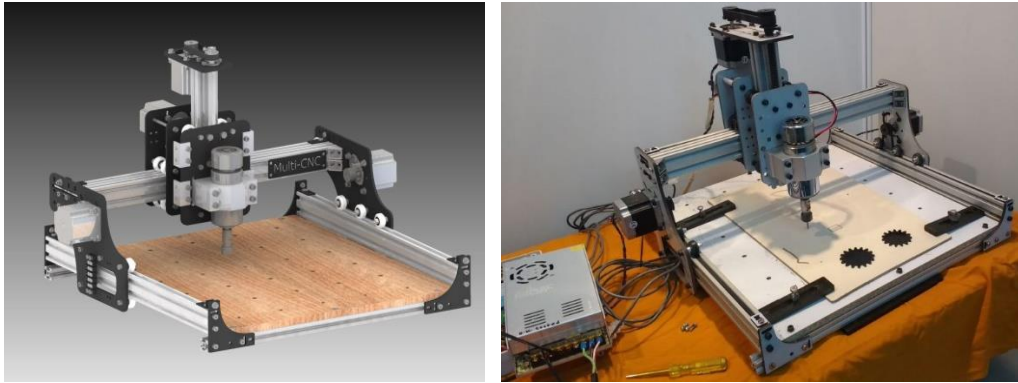


# SVP LASER TECHNOLOGIES PVT. LTD.

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## MULTICNC PROTOTYPING MACHINE MODELS

### MCNC LITE MODEL:



### FEATURES:

Based on openbuild V-slot extrusion designs. DELRIN rollers, XL timer belts drive with KEVLAR reinforcement, 400 Watts spindle, 1 Nm stepper motors, MultiCNC & AutoCAM2D software license. Equivalent to XCARVE machine with robust Drive electronics and advanced CNC and CAM software.

1x1 model : 75K

2x2 model: 99K

TAX, P&F, Freight costs extra.

Installation, Training, optionally available @ extra cost.

### **Pros:**

- Low cost: Multiple machines can be bought for hands on usage by 60/120 students in a class.
- Light weight: Easily portable. So can be even taken to classroom for teaching.
- Open architecture: Students can dismantle and re-assemble the CNC machine. It has an Open Source design.
- Several CNC concepts can be taught using pen-plotter, foam cutting, wood cutting (refer to CNC concepts in annexure).

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- Suitable for light prototyping of parts for projects (machining time taken will be more compared to Heavy duty machines).

### **Cons:**

- Not suitable for regular or heavy duty prototyping. Hard materials will take lot of time to fabricate.
- Light weight machine ( ~ 15 Kgs ) will have vibrations due to cutting forces.
- Will have ~ 0.5mm backlash due to flex in timer belt drives, plastic bearing wheels.
- Times belt drive has limited life. May get loose during usage. Thus may require periodic maintenance (re-tensioning) or replacing.
- Delrin wheels are used as motion guides. So it may wear off with time. So may require periodic maintenance (re-tensioning) or replacing. Also the Scrap board may require periodic replacing.

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## MULTICNC HD MODEL: (HEAVY DUTY MODEL)



### FEATURES:

Heavy Duty Model, HIWIN STEEL LM GUIDES, SPRING LOADED RACK-PINION DRIVE, 2 HP variable RPM spindle motor, 2 Nm stepper motors, MultiCNC & AutoCAM2D software license.

1x1 model: 1.5 LAKHS

2x2 model: 2 LAKHS

TAX, P&F, Freight costs extra.

Installation, Training, optionally available @ extra cost.

### Pros:

- Best model for training and prototyping.
- Medium cost.
- Suitable for heavy duty prototyping with 2HP motor and 2 Nm stepper motors with gear reduction for mechanical torque advantage.
- Spring loaded rack-pinion keeps backlash minimal and gives longer life.
- Hiwin steel LM guides give smooth motion and longer life.

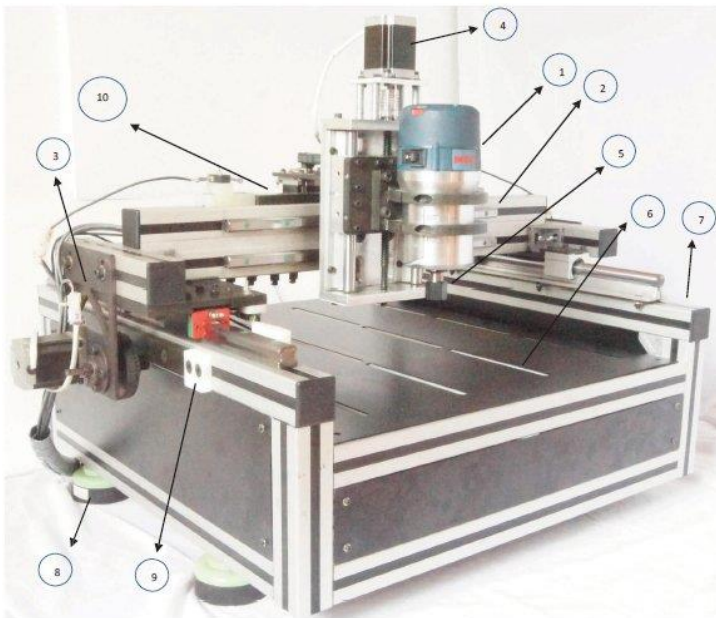
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### Cons:

- Medium weight (~ 60-70 kg). Will need resources for portability.
- Spring loaded pinion system can have some compliance in the bearings and can result in small backlash (~ 0.2mm). This may not be acceptable for high precision applications like PCB milling, Jewellery designs manufacture etc.

MULTICNC MACHINE FEATURES



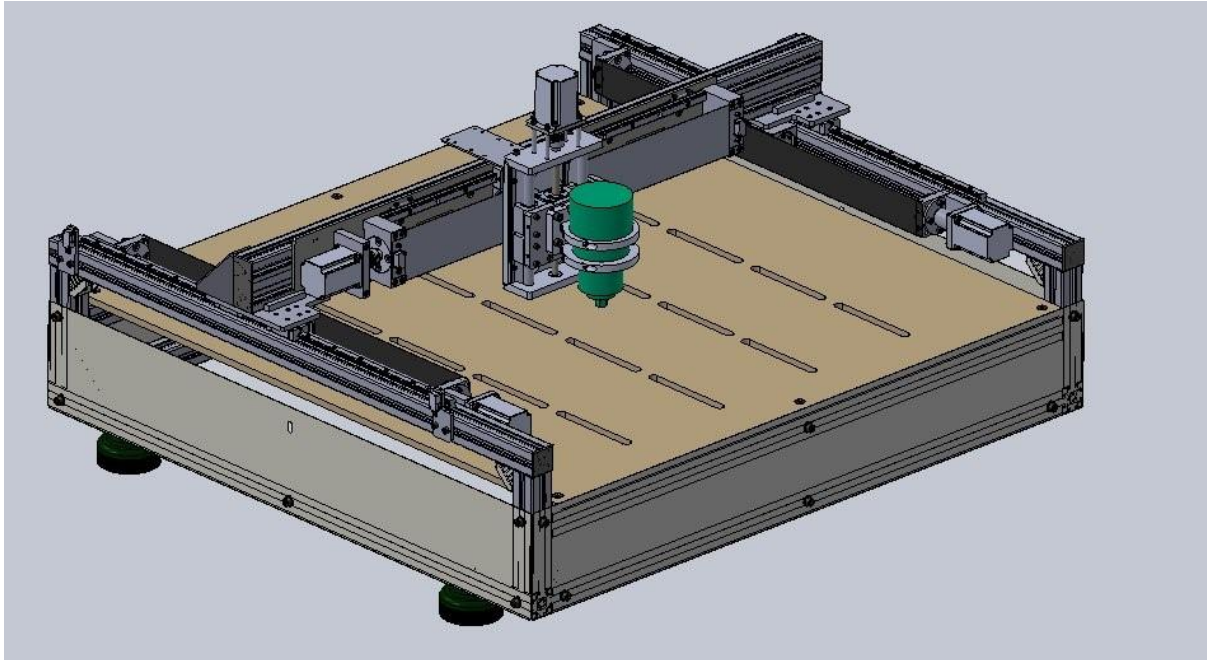
- 1) 2HP variable RPM spindle motor
- 2) Double Hiwin LM guides
- 3) Double side Y-axis drive with spring loaded anti-backlash rack-pinion drives or BALL-SCREW drive option
- 4) 2 Nm Nema23 hybrid stepper motors.
- 5) ER-16 precision collet
- 6) T-slot table for workpiece clamping
- 7) Bosch Rexroth Aluminium extrusions.
- 8) Anti-vibration machine legs.
- 9) Mechanical stoppers & Limit switches
- 10) Cable rack,
- 11) FLOAT™ attachment for extra tools attachment
- 12) Industrial Panasonic CNC controller
- 13) AutoCAM2D DXF2Gcode software
- 14) Optional upgrades: Dust collection system, Camera & Touch probe attachment for reverse engineering, Sticker cutting tools, engraving tools etc.

[WWW.MULTICNC.IN](http://WWW.MULTICNC.IN), [WWW.SVPLASER.COM](http://WWW.SVPLASER.COM), PH: 9500122107

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## MULTICNC PRO MODEL : ( WITH BALLSCREW DRIVE )



### FEARTURES:

Precision mode, HIWIN STEEL LM GUIDES, PRECISION BALL-SCREW DRIVE, 2 HP variable RPM spindle motor, 2 Nm stepServo motors, MultiCNC & AutoCAM2D software license.

1x1 model: 3.0 LAKHS

2x2 model: 3.75 LAKHS

TAX, P&F, Freight costs extra.

Installation, Training, optionally available @ extra cost.

### Pros:

- Precision ballscrew give high accuracy parts . Backlash less than 0.1mm.
- Tight mechanical tolerances keep vibrations to minimum level.
- Suitable for heavy duty prototyping.

### Cons:

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- Higher machine cost
- Speeds are lower with stepper motors. (~ 1 m/min max speed).
- Since mechanical tolerances are tight, any small mis-alignment can result in mechanical jamming, which can cause stepper motor to miss steps. So it is better to use servo motors with ball-screw drive, if you are going to run long jobs in CNC mc (like frequent milling of aluminium, which will take longer time due to multiple pass cutting). Servo motors are expensive and add to the cost.
- Also wood dust can settle on ball-screw and cause jamming. Bellows can be added at extra cost to prevent this.

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## OPTIONAL ACCESSORIES:

- 2a) Variable rpm (8K-24K rpm) Bosch spindle motor: 20K
- 2b) Enclosure & limit switches: 30 K
- 2c) 3D surface machining software: 25K
- 2d) Hot knife with tool-holder: 5K
- 2e) Ball-screw option (for better accuracy): 10K per axis plus 5K per feet
- 2f) Carbide end mill set: 10K
- 2g) Extra support for aluminium cutting: 25K.
- 2h) onsite installation & training: 5K per day. (If we are travelling to Mumbai and spend 2 days on site, we have to travel by train for 2 days to&fro. So total number of days will be counted as 4).
- 2i) Advanced CNC controller: 75K
- 2j) Webcamera attachment & software for basic CMM measurement functions: 15K.
- 2k) Servo motor option: 20K extra per axis. (Recommended for high-speed applications like 3D machining, engraving etc. and for ball-screw machines) (30K for Japanese SANYO DENKI servo drives).
- 2l) High power brushless spindle motor with VFD drive (2.5 KW, air cooled): 60 K extra. (Recommended for continuous use of machine for production jobs).
- 2m) Dust collector: 60K

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## **CNC Concepts that can be taught in MULTICNC machine**

- CNC machine operations
- Manual G-code writing (Part programming).
- Program zero , machine zero.
- Tool radius compensation (G41 , G42).
- Tool length compensation.
- CAM software for CAD to G-code.
- Tool clamping, workpiece clamping , workpiece alignment, jogging, spindle on/off, spindle rpm , homing, conventional vs climb milling, multi-parts cutting, resuming from power cut, runtime feed rate adjustment.
- CAM concepts: pre-processing (correcting errors in CAD drawing), open polyline, tiny polyline, overlapping entities, program zero, tool radius compensation in CAM, feed rate setting, ramp and plunge, milling, lead in/out, multi-pass cutting. Using jump to line, resuming from power cut, tool path optimisation etc.
- Part orientation compensation, part height/depth compensation, double side machining, machining parts larger than machine size (by part indexing) multi-tool cutting, multi-tool offset calibration, Auto tool changing, 3D part programming etc.

**We already have CNC machine in college, but we hardly find any use for it :**

- CNC milling and router machines are mandatory for CAD/CAM as for B.E Mechanical engineering as per AICTE syllabus. A lot of colleges have already purchased it.
- But there are several problems in the current scenario because of which graduates hardly experience using it.



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- For some unknown reasons, several colleges buy heavy duty metal cutting CNC machine. This makes the machine very expensive.
- Metal cutting takes a lot of time. A small 50X50X6 mm piece may take 1 hour to machine. If 60 students in a batch have to use it, it becomes impractical.
- Raw material for 60-120 students will be very expensive.
- Wood cannot be used as it can clog the motion guideways/screw drive.
- Many students are not allowed to operate these machines in fear of break down. In several colleges CNC machines are simply kept as show case to show to AICTE inspection committee.
- Also syllabus and exam focusses on teaching G-code writing. While basic G-code knowledge is still useful, with the advent of modern CAM software, it is not so relevant for industry.
- Beyond G-code writing, faculties need to realise the power of CNC as a powerful engineering tool for building prototypes of their designs and to practice manufacturing and fabrication skills. It is possible to use digital manufacturing tools and build various products like furniture, toys, PCB, mechanisms, robots, dies, fixtures, aero models etc. etc. and get hands-on learning experience.
- For getting started in hands-on prototyping: you can refer websites like [Instructables.com](http://Instructables.com), [thingiverse.com](http://thingiverse.com), [Ecnshop.com](http://Ecnshop.com) etc.