

# CNC Router 'Otocoup': Bill of material (BOM)

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Thread rods M8 on carriage n, axis n  
 Lg 50 : 8 X  
 Lg 60 : 1 X Ch.Z, Y  
 Lg 75 : 4 X Ch.X, Y  
 Lg 80 : 3 X Ch.Y, Z, motor  
 Lg 95 : 4 X Ch.Z, X  
 Lg 148 : 6 X, precision needed  
 Lg 160 : 3 X Ch.X, Y  
 Lg 160 : 4 X Ch.Y, X  
 Lg 165 : 3 X Ch.Z, Y  
 Lg 205 : 3 X Ch.Y, Z  
 Lg 210 : 1 X Ch.Z, Y  
 Lg 220 : 1 X Ch.Z, Y  
 Lg 235 : 2 X Ch.X, Z/option 295  
 Lg 285 : 2 X Ch.X, Z/option 345  
 Lg 305 : 2 X Ch.X, Z/option 365  
 Lg 325 : 2 X link shafts  
 Lg 265 : 1 X ch.Y, Z

Bearings D 8 x 22 L 7: 52  
 Nuts : env. 200

Building wood parts :  
 75mm x 65mm x 4 m : 2 x  
 38mm x 60mm x 2 m : 8 x  
 27mm x 40mm x 4 m : 12 x  
 15mm x 20mm, 20mm x 40mm : parts

Wood screw  
 4 x 40  
 5 x 50  
 6 x 100

Ply/medium BOM  
 Ply thk. 3mm : 25 x 80 cm  
 Ply/medium thk. 10mm: 25 x 100 cm  
 Ply/medium thk. 20mm: 10 x 100 cm

1 Plastic angle 40 x 40 x 2000 mm  
 1 Aluminium tube diam. 20x17x2000 mm  
 1 Aluminium band 25 x 2 x 1000 mm  
 1 Steel band 20 x 5 x 1000 mm  
 1 Steel band 50 x 5 x 500 mm

mason rulers 100 x 18 mm :  
 3 rulers 2000 mm, axe Y  
 1 ruler 3000 mm, axe X, top  
 1 ruler 4000 mm, axe X, bottom

Counterweight steel bar :  
 2 bars 8mm x 40mm x 2000mm

PVC tube diam 80mm x length 1000mm

Aspiration :  
 2 tubes PVC diameter 50 x 2000 mm  
 4 elbows 90° for tube 50 mm  
 5 closed rings for tube diam 50  
 1 flexible tube 40/50, length est. 200 mm  
 1 vacuum cleaner flexible tube length 2400 mm  
 1 intermediate tank with 'cyclone' cover is needed between vacuum cleaner and router.

Carriage X bottom : Tubes A, E(2), G, H(1)  
 Carriage X top : Tubes B, E(2), H(1)  
 Carriage Y : Tubes C  
 Carriage Z : Tubes I, J, K

-Anodised aluminium angles glued on rulers  
 Round aluminium rulers corners with a plane and glue steel angles with Epoxy after surface preparation.

Carrying with timing belts :  
 Couple stepper 6.2 kg.cm  
 Gear module 1 12 teeth x 100 teeth  
 Torque on shaft = 6.2 x 100/12 = 51.66 kg.cm  
 Belt HTD 5M width 25mm  
 Minimum sprocket of 12 teeth, give a primitive diameter of  $12 \times 5 / \pi = 19.098$  mm, radius 9.55 mm  
 So, load on belt = 51.66 kg.cm / 0.955 cm = 54.1 kg.  
 Belt HTD 5M width 25 is service tightened at 55 kg.  
 Please note that 'XL' belts are weaker. 'XL' belt of 9.52 mm width must be service tightened at 8 kg... Don't use them.  
 Remember that Y carriage (7.5 kg) is hanged to the belt. Moreover, precision is related to belt stiffness.

## Transmission BOM

Axe X, Y : Gear 12 x 100 teeth, module 1.  
 so primitive diameter is 12 mm x 100 mm  
 Sprocket for HTD belt M5 12 teeth drilled at 8 mm  
 Belts length (triple check before cut !  
 Y axis : 2150 mm  
 X axis, top : 3360 mm  
 X axis, Bottom : 3400 mm  
 To be bought : 9 meters.

Axe Z : Screw M8 x mm + 8mm brass nut insert.

Reel to tension electric cable :  
 Diameter 82 mm, sides diam. 105 & 120 mm. Made with rainwater drain tube.

Cables to steppers and accessories :  
 if bipolar : 4 x 0.22 mm<sup>2</sup>, shielded, flexible type, diam. 4 mm  
 With that section, max current is around 2.5 A  
 Length of cables :  
 -Steppers, laser pointer supply: 25 m  
 -End switches : 15 m  
 For unipolar motors, you will need 6x0.22 mm<sup>2</sup> but this cable is bigger diameter, so the reel must be larger diameter and will began to take some room.

www.otocoup.com

USA citizens are reminded that 1"=25.4 mm  
 M8 screw can be replaced by 5/16" screw  
 Squared tubes 20x20 mm --> 3/4"x3/4"  
 Angles 15x15 mm --> 5/8"x5/8"  
 Medium/ply thk | 3mm | 10mm | 22mm |  
 ---> | 1/8" | 3/8" | 7/8" |