

# MultiCam

CNC Cutting Solutions

## Features & Specifications Guide for MultiCam 7000 Series CNC Router

### The Ultimate in Heavy-Duty, High-Performance CNC Routing

MultiCam's 7000 series routers offer the ultimate in high-performance CNC machining and are available in a broad range of standard table sizes and spindle configurations.

Designed for high-speed, heavy-duty routing, 7000 series machines are easily configured to meet demanding application requirements in the woodworking, plastics and non-ferrous metals industries.

Heavy-duty, plate frame construction coupled with a space-saving, moving gantry design makes the 7000 series a robust, commercial grade machine designed for today's competitive manufacturing environment.

**MultiCam, Inc.**  
1025 West Royal Lane  
DFW Airport, Texas 75261  
972.929.4070 • fax 972.929.4071  
[www.multicam.com](http://www.multicam.com) • [sales@multicam.com](mailto:sales@multicam.com)

All specifications subject to change.  
© 2008 MultiCam, Inc. All Rights Reserved.



*Innovation. Quality. Performance.*

# 7000 Series Specifications

No machine offers more standard features than the MultiCam.

- User-friendly operator interface
- 25mm & 35 mm linear ball bearing profile rails for maximum stiffness
- 3500 inches/minute rapid traverse
- Standard Automatic Tool Calibration.
- High Speed 3-axis Motion Controller
- 12 Megabytes of Memory with unlimited file size transfer capabilities
- High-performance brushless digital AC servo system standard
- Standard Ethernet or RS232 direct connections



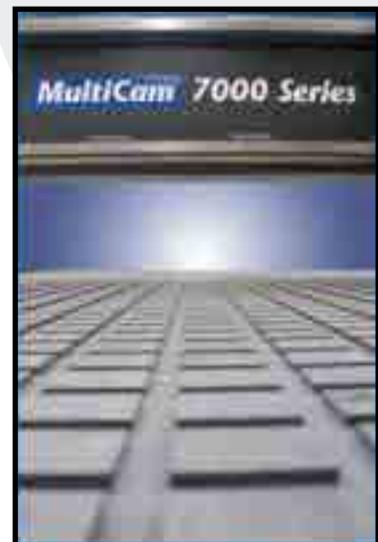
## ATC (Automatic Tool Changer)

The 7000 series machine is available with an optional 12-position rotary tool changer. The system is optimized for bidirectional rotation and takes the shortest route to help reduce tool change time. All ATC systems come standard with Automatic Tool Calibration, and the tool change routines are built into the controls simplifying integration to your favorite CAM software. An Automatic Tool Changer solution will help reduce job times, improve accuracy, and reduce setup errors.



## Standard Working Surface

The standard working surface is a 1" thick 80 - 82 Durometer phenolic with a grid pattern to utilize 0.500 x 0.250 foam gasket tape. The phenolic is mounted to the top of the steel base frame and is machined in place. This ensures a flat cutting surface normal to the spindle. Phenolic makes an excellent work surface because of its dependable mechanical strength and dimensional stability. In addition phenolic has a low moisture absorption, resists heat and wear, and can be repaired as needed.



## Base Frame

The MultiCam 7000 Series base frame is a one-piece steel plate frame that is welded, stress-relieved, and precision-machined. It features .5" thick side plates and 2.0" bar stock to support the X-axis linear bearings. One-piece construction allows for a very accurate and smooth cutting system, while greatly reducing the amount of time needed for installation and essentially removing the possibility for installation errors that could affect the performance and accuracy of the system.

Dual X-axis – 35mm Linear Rails, AC Brushless Servos, Precision Planetary Gearboxes, and Rack and Pinion



## Gantry

The gantry is fabricated using steel plate up to .75" thick and is welded, stress-relieved, and precision-machined. Features include extensive internal ribbing both perpendicular (90°) and diagonal (45°) to the length of the gantry insuring a smooth, vibration free cut.



## Gantry Supports

The 7000 Series gantry supports are heavy steel weldments. These components, in conjunction with wide 35mm X-axis bearing spacing, give the structural tube gantry extremely rigid support.

## Linear Bearings

The 25mm ball linear bearing profile rails with stainless spring steel strip covers are standard in the Y and Z axes. 35 mm bearings are standard in the X axis. Linear bearings feature:

- High rigidity and top load capacities in all load directions
- Lowest possible noise level and best running characteristics
- High torque load capacity
- 4 bearing packs per axis
- 4,000 lb. load capacity for 25 mm bearings and over 9,600 lb. load capacity for 35 mm bearings



# 7000 Series Specifications

## Precision Planetary Gearboxes

Alpha Precision Planetary Gearboxes are the top of the line in the industry. Case hardened and finished ground high carbon alloy steel gears guarantee the lowest backlash and highest service life available. Alpha Gearboxes are one of the many components that make the MultiCam a smooth, accurate, and long-lasting cutting system.

- Single Stage 10:1
- Backlash < 2 arcmin
- Efficiency > 97%
- Low noise level
- Integrated thermal length compensation
- Designed for cyclic and continuous operation
- 5-Year Manufacturer Warranty



## Regulator Units

Machines equipped with tool changing spindles come standard with SMC filter regulator units that also include an ambient air drier.



## Ball Screw Assembly

The 7000 Series ball screw assembly has an available 17" of stroke that is ideal when using specialty tools and allows for the option of adding larger gantry clearance in the field. Gantry riser blocks are available to increase the throat of the machine by 4" or 8". The 20mm ball screw is supported by precision dual angular contact ball bearings in a steel housing. The top of the screw is mounted to a spring-actuated failsafe brake system.



## Digital Servo Drives

Teknic's SSt Eclipse E750 digital servo drives are high-bandwidth, digital vector servo drive systems and are standard on all 7000 Series machines. These drives seamlessly integrate position, velocity, and torque loops to provide uncompromised tracking accuracy, smoothness and reliability. The Eclipse drives used in MultiCam servo-driven machines are the latest in a line of high-performance drives that advances the state of the art by utilizing this seamless coordination in such a way to allow all information to be shared in real time so all system functions cooperate in any situation. For example, if the torque loop senses that the motor has reached 100% torque output, it is instantly passed upstream to the servo compensator and the system delivers a coordinated response, maintaining precise control. You will realize tighter tracking, smoother motion, and faster rapid traverse - all of which yield superior machine throughput and reliability.

## Servo Drive Features

- SSt Eclipse E750 servo is 30A peak, 15 continuous @ 330Vdc
- Digital control loops with 800Hz large signal velocity bandwidth
- 2kHz small signal response
- 35 microsecond total servo phase delay. The SSt Eclipse drive is the fastest in the industry
- True, closed-loop, sinewave commutation with vector feed-forward and DQ decoupling provides near-zero torque response time at any speed. This maximizes motor responsiveness and minimizes motor heating
- The SSt Eclipse drive utilizes an adaptive control algorithm (IMT) based on Neural Fuzzy Logic
- The IMT virtually eliminates the concern of inertia matching and allows for loads of large and varying inertia without impacting performance.
- The SSt Eclipse drive uses small-signal, sliding-mode, automatic gain modulation to eliminate hunting even with extreme gains. Axes will be perfectly still and have no loss of tracking or position accuracy.



Servo Amps

- Teknic's proprietary Regressive Auto Spline™ (RAS) technology produces ultra-smooth trajectories. The profiles are jerk and jerk-derivative limited, which reduces shock, vibration, noise, and mechanical wear.
- Many safety and protection features including: Short circuit (phase-to-phase, phase-to-ground), over temperature, over voltage, over current, protected for open windings, fuse, True RMS torque limiting, automatic speed limit, motor jam detection, and much more
- Superior tracking accuracy multi-derivative, state feed-forward gains greatly improve tracking performance and do not create the audible noise and torque chatter of traditional implementations

Teknic has been designing and building digital servo drives for nearly two decades. Tens of thousands of drives are sent into the field each year to OEMs, with the first having been delivered in 1994. With that field experience and an evolutionary approach, the SSt-Eclipse Series used by MultiCam is standing on the shoulders of the drives before it, which yields not only robust performance, but also MTBF numbers that make the competition blush. The MTBF of the SSt Eclipse E750, for example, is over 700,000 hours.

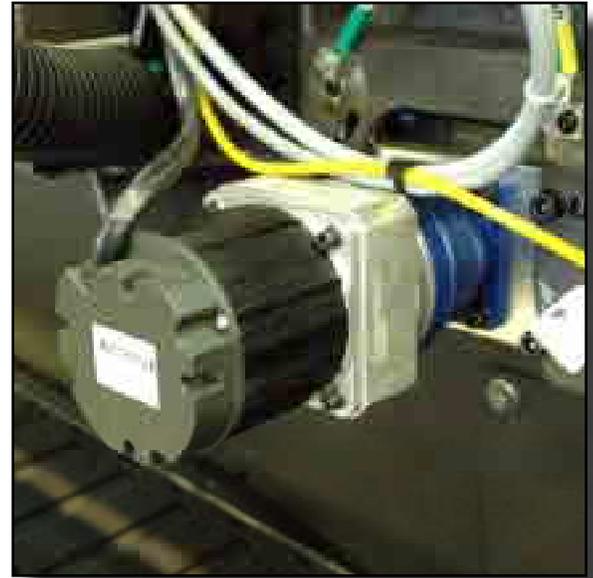
# 7000 Series Specifications

## Brushless AC Servo Motors

After extensive testing, MultiCam has found the Teknic Hudson Brushless AC Servo Motors to be the premier solution on the market today. Teknic has an extensive history in motors and controls dating back to its founding in 1985. With a long history of providing critical components to military and aerospace applications and a leading supplier to commercial and industrial applications, Teknic creates servo motors that give MultiCam machines a competitive edge in the market.

## Brushless AC Servo Motor Features

- 50 lb. indefinite radial load limit 1" from face
  - Brushless, maintenance-free sinewave servo motors with oversized, high precision, deep groove radial bearings being the only wear point
  - Neodymium-Iron-Boron magnets providing high power density and fade-free performance
  - High power-to-rotor inertia ratio
  - Direct winding on electrostatically powder-coated stators gives high thermal conductivity for better RMS ratings.
  - Windings are rated to 155°C, improving thermal range.
  - Extremely low electrical time constants increase motor responsiveness, which provides superior tracking accuracy to competitive units.
  - Low distortion, sinusoidal back EMF combined with low detent torque improves motor smoothness and lowers audible noise.
  - Precision bearings both reduce viscous friction and motor noise at high speed and help smooth motion. The high precision bearings are mechanically captivated and chemically bonded to maintain proper preload and alignment under all rated load conditions and accidental impacts. The drive shaft is made of stainless steel.
  - The stators are glued and mechanically locked to prevent slippage regardless of use conditions.
  - Finite element analysis is utilized to reduce stress concentration on machined areas of the shaft. This allows the use of oversized bearings without sacrificing shaft strength.
- The stainless steel encoder disk is a floating differential, and the read head has a multiple-aperture grating for reliable operation even when dusty or dirty. It will not break like glass encoder disks. The read head is also fully encapsulated for increased reliability and ruggedness. Combined with the triple redundant reading/voting circuits in the drive, this provides incredibly robust encoder capability.
  - The encoder housing is integral to the shaft automatically compensating for thermal expansion.
  - The 4000-line encoder with quadrature sampling produces 16,000 counts per revolution.



Servo Motor

## High Speed Helical Rack System

The new High Speed Helical Rack system upgrade to the MultiCam 7000 Series CNC Router is very impressive. If watching the system move is not impressive enough, just wait until you cut with it. With speeds of 3500 ipm (single axis) the Helical Rack System can get to a full speed move less than .5 seconds.

There are a number of advantages that Helical Rack has versus straight rack. Helical rack & pinions run much quieter than straight rack and pinions, especially at high speeds. Due to the angular cut in the Helical rack and pinion setup, there are thrust loads on the gear shaft. This action requires thrust bearings to absorb the load and maintain gear alignment. The Alpha Gear Boxes that MultiCam already uses are designed to handle this load, and the new design of the 7000 Series automated routers allow for exceptional perpendicularity and gear alignment. Faster acceleration and accuracy is achieved because of a greater number of teeth engaged than straight racks. Distributing the load over several teeth also reduces wear and increases the life of the rack and pinion system.

The Helical Rack System is important to companies wanting to cut smoother, faster, and more accurately. Cabinet shops or other companies that have projects requiring point to point drilling will see a substantial decrease in job times. This is primarily due to the high accelerations. Customers with longer machines will also see a significant benefit with the high-speed rapid traverse moves.



# 7000 Series Specifications

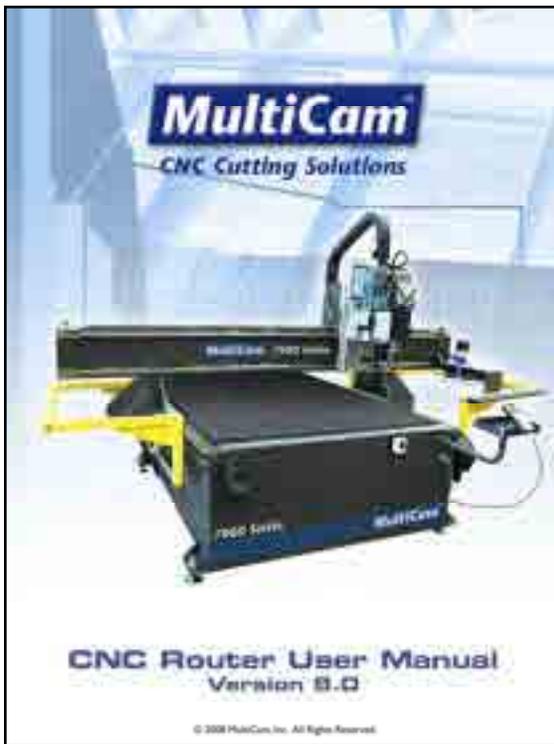
## Standard Features



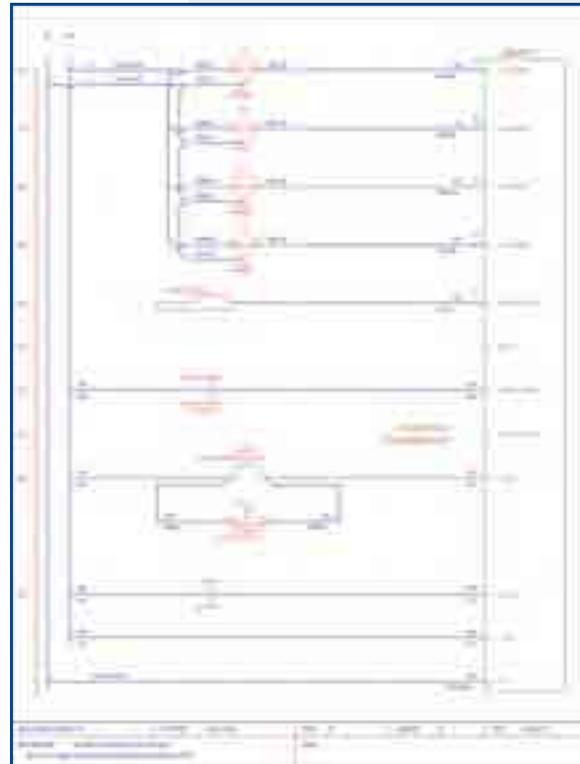
Leveling Feet



Tool Box

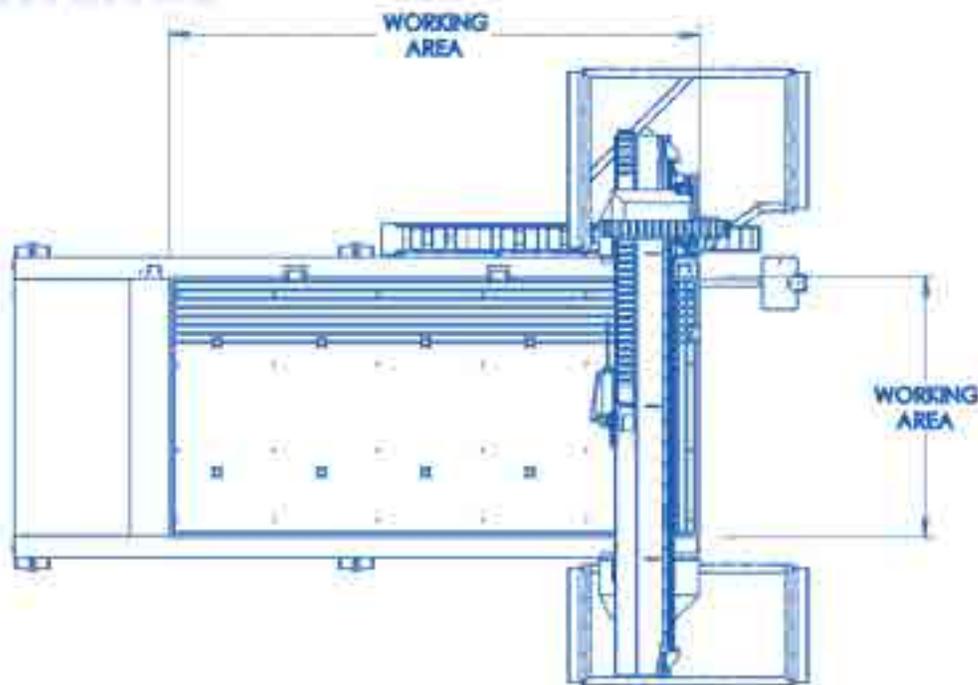


Operation Manual



Electrical Schematics

Inches

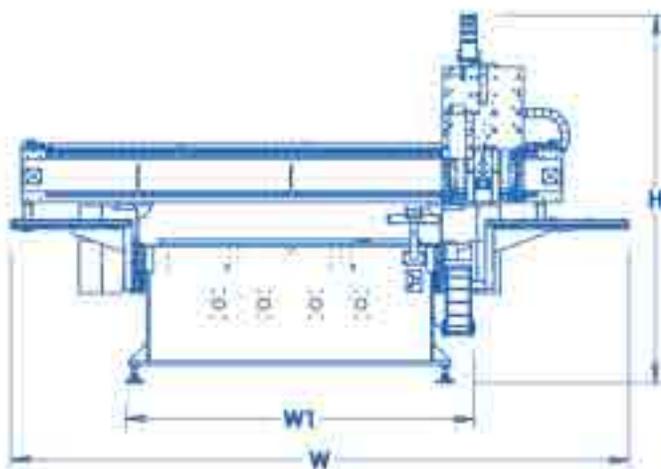
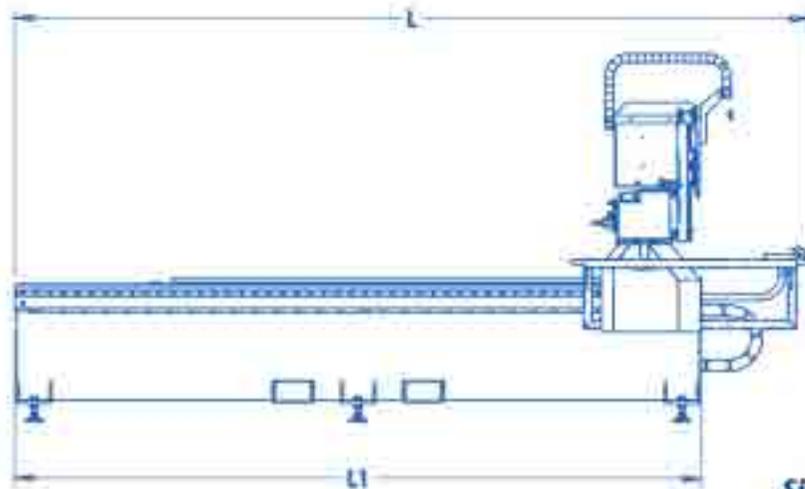


Millitcam

7000 Series

**7000 Series Specs (Inches)**

- Z-Axis Clearance: 8" - Optional 12" or 16"
- Z-Axis Travel: 17"
- Repeatability: +/- .001"
- Positional Displacement Accuracy: +/- 0.005" over 10 feet
- Cutting Speed: 2,400 ipm
- Rapid Traverse: 3,500 ipm
- Drive System X and Y axis: Rack and Pinion
- Drive System Z axis: Ball Screw
- Standard Work Surface: 1" Phenolic



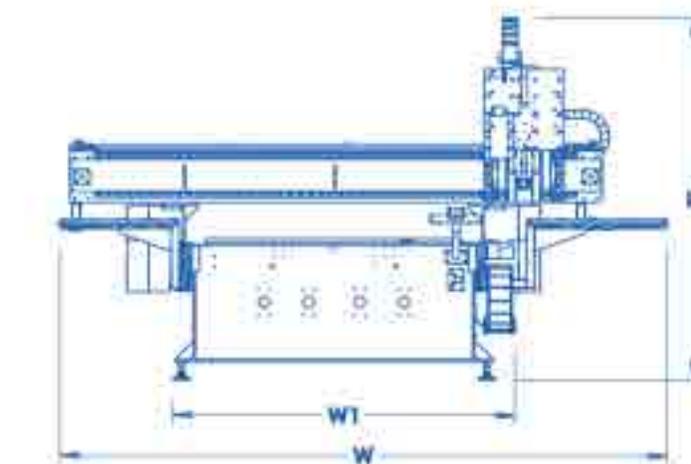
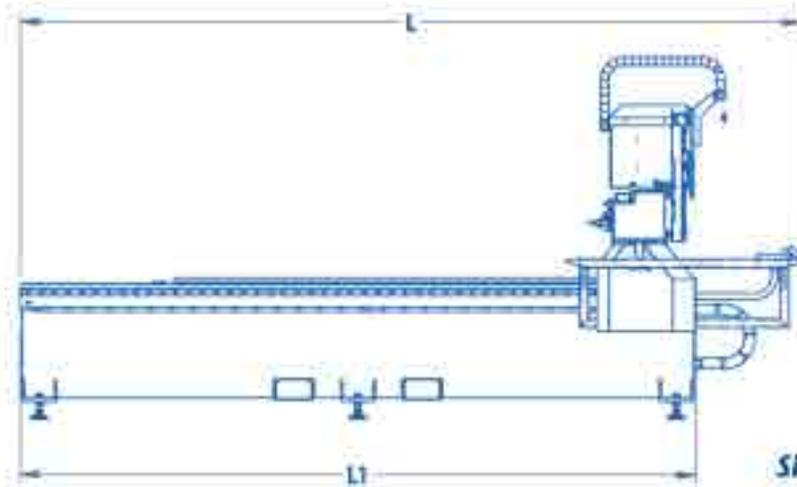
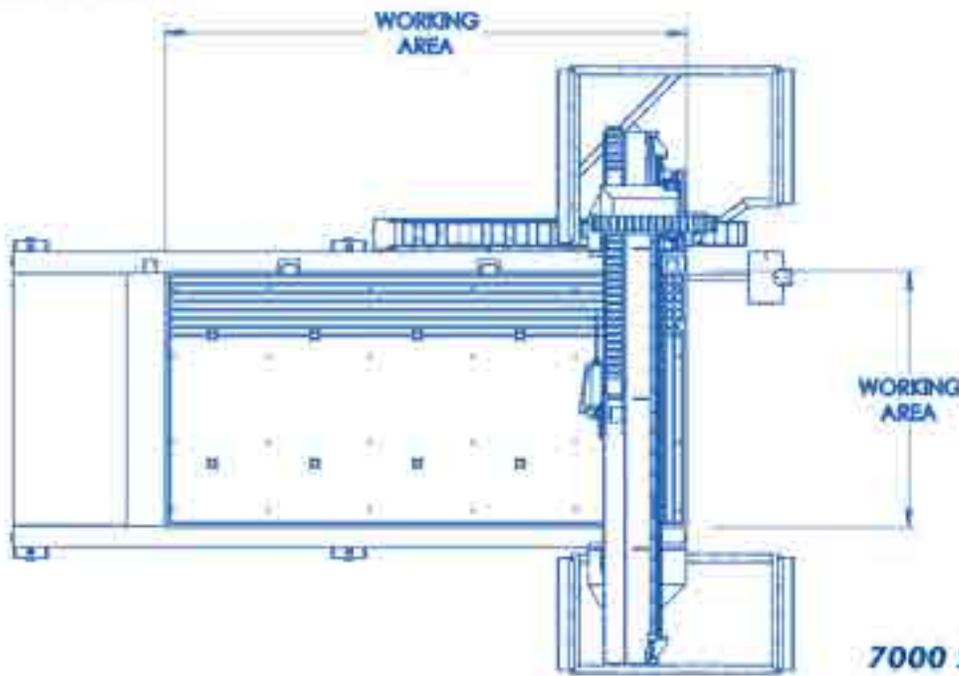
**Size Chart (Inches)**

MODEL	L	L1	W	W1	H	WORKING AREA
103	162	136	113	72	86	50 x 100
202	122	96	123	80	86	60.5 x 80
204	184	158	123	80	86	60.5 x 122
205	206	180	123	80	86	60.5 x 145
208	302	268	123	80	86	60.5 x 242
209	350	316	123	80	86	60.5 x 290
304	184	158	143	98	86	84 x 122
305	202	180	143	98	86	84 x 145
306	232	206	143	98	86	84 x 170

Add 20 inches to W for optional Wide or Dual Carriages.  
Add 4 inches to H for optional Wide Carriage.

metric

MINICOM  
7000 Series



**7000 Series Specs (metric)**

- Z-Axis Clearance: 203 mm - Optional 304 mm or 406 mm
- Z-Axis Travel: 432 mm
- Repeatability: +/- .025 mm
- Positional Displacement Accuracy: +/- 0.125 mm over 3 meters
- Cutting Speed: 70.0 m/min (1016 mm/sec)
- Rapid Traverse: 87.5 m/min (1482 mm/sec)
- Drive System X and Y axis: Rack and Pinion
- Drive System Z axis: Ball Screw
- Standard Work Surface: 25 mm Phenolic

**Size Chart (metric)**

MODEL	L	L1	W	W1	H	WORKING AREA
103	4115	3454	2870	1829	2184	1270 x 2540
202	3099	2438	3124	2032	2184	1537 x 1537
204	4674	4013	3124	2032	2184	1537 x 3099
205	5232	4572	3124	2032	2184	1537 x 3683
208	7671	6807	3124	2032	2184	1537 x 6147
209	8890	8026	3124	2032	2184	2032 x 7341
304	5131	4013	3632	2489	2184	2134 x 3099
305	7620	4572	3632	2489	2184	2134 x 3683
306	5893	5232	3632	2489	2184	2134 x 4318

Add 508 mm to W for optional Wide or Dual Carriages.  
Add 102 mm to H for optional Wide Carriage.