TORCHMATE®
CNC CUTTING SYSTEMS

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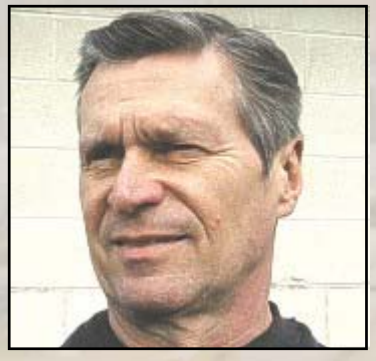

The Torchmate Goal

This photograph, which occupied the cover of Welding Design and Fabrication Magazine in December, 1980, illustrates a typical CNC plasma cutting table of of that time. On page 80 of that same issue, our Torchmate pantograph flame cutting machine received that magazine's prestigious 1980 Prize Product Award.

CNC machines have come a long way since those early days of punched tape and three ton gantry carriages. Pantograph machines with magnetic tracers and steel templates have all but disappeared. Torchmate offers a full line of coordinate drive shape cutting machines that are priced within the budget of even the smallest shops.

Our goal now, as it was back in 1980, is to bring you the latest in automated machine technology at an affordable price. In this catalog, you will find seven different Torchmate models, with capacities ranging from 18"x24" to 8' x 40'. We know of no other manufacturer with such a wide variety of machine capacities.

We hope you enjoy reading about our product line as much as we have enjoyed bringing it to you.

Best regards,
Bill Kunz Sr.
President,
Applied Robotics, Inc.

Photo courtesy Welding Design & Fabrication

A PASSION FOR PRECISION

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Torchmate machines are designed to fill the gap between traditional CNC machines costing $50,000 to $100,000 or more, and the light-duty hobby type machines that have recently appeared on the market.

With all the ruggedness, precision, and functionality of the high priced units, at a fraction of the cost, Torchmate is truly in a class by itself.

INTRODUCTION:

In the first two decades of the 20th century, there was little choice but to manually cut out steel parts using an oxy-fuel cutting torch, as shown here.

The cutting oxygen combined with the iron content of the steel, and was carried off in the form of iron-oxide.

Oxy-fuel cutting is a chemical process, rather than a heat process. Under laboratory conditions, it is possible to turn off the acetylene or other gas, and have the cut continue from only the chemical reaction.

Since non-ferrous metals do not contain iron, they cannot be cut with oxy-fuel.

1917 saw the introduction of a new machine that guided a torch by means of a steel template of the same shape as the desired cut.

An example of one of these pantograph cutting machines is shown at the right. Known as a pantograph machine, it uses an overhead mounted steel template.

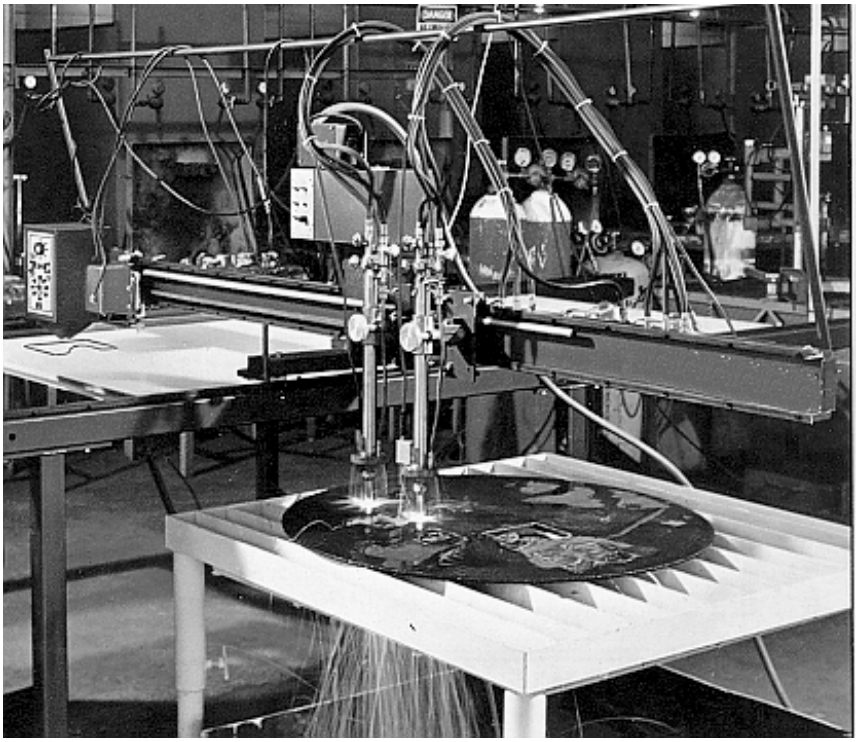
A magnetic, knurled roller moves around the edge of the template, powered by a variable speed motor. The tip of a cutting torch, directly below and in line with the center of the tracing rotor, duplicates the template's shape in steel, below.

Some machines attempt to use the same type of magnetic tracer to move a coordinate drive (two axis) machine, but the rolling resistance is generally too great on these units to achieve any degree of reliability.

Plans for building the above pantograph cutting machine are available for $40.00. See the price page for more information.

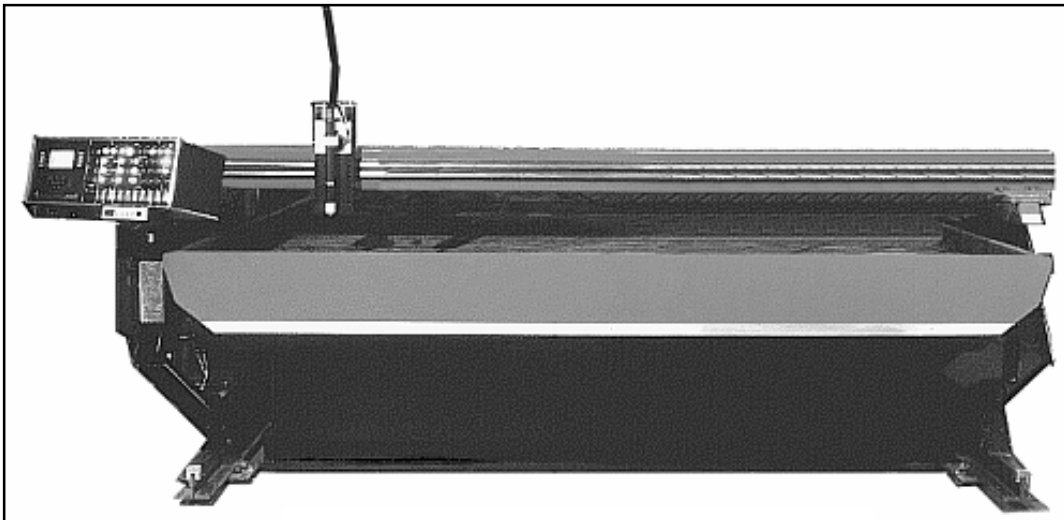
In the late 1950s, machines became available that used line drawings of shapes to produce the same shapes in steel plate. These units used an electric eye tracing system. While a vast improvement over units with magnetic tracers, these machines still had many limitations.

Drawings had to be the same size as the finished part, and each part in a nested pattern had to be drawn individually.



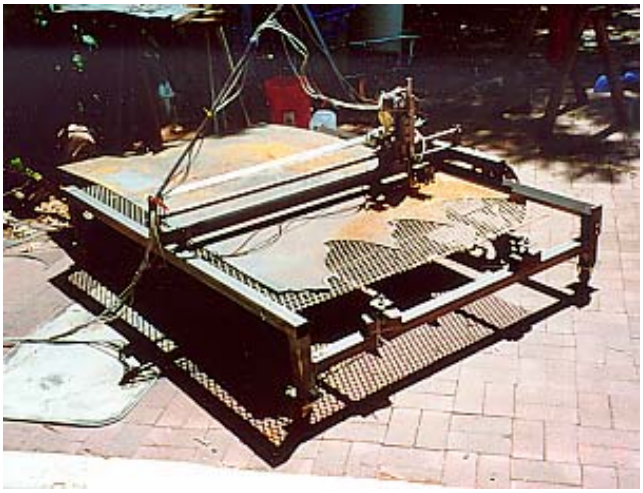
By the 1970s, shape cutting machines had evolved to the point of using perforated paper tape to provide instructions to the machine. These were the forerunners of today's CNC (computer numerical control) cutting machines. During the 1990s, they became refined to the point that any IBM compatible desktop computer could be used both to design the shape, and to control the machine that cut it.

CNC shape cutting machines have traditionally into two categories: medium to large capacity industrial quality production units typically costing $40,000 or more as pictured below, and small capacity, light duty, hobby oriented machines priced in the vicinity of $10,000 or less. These small machines are described more fully on the next page.



TYPICAL HEAVY INDUSTRIAL MACHINE

A couple examples of light-duty hobby type machines that have been marketed over the past few years are shown in the two photos below. These units typically use light tubing construction and non-precision guide surfaces.



Light duty machines sometimes are designed to hold a manual torch instead of an industry-standard vertical machine torch to appeal to hobbyists with small budgets.

Depending on the design, this can make it difficult to change the electrode and nozzle without physically removing the torch. Because the torch can't be replaced in precisely the same position, the piece being cut at the time is usually wasted. Torchmate's 4' x 4' capacity Small Shop Machine is available with a manual torch holder that does not have to be removed to change the consumables. That machine can be seen on page 11 of this catalog.

Shown below is a photo of a typical small machine with a manual torch held in place by a conglomeration of brackets. It is impossible to see the tip of the torch to position it. It is also necessary to remove the torch to change the consumables.

At the right is the manual torch holder of a Torchmate 4' x 4' Small Shop Machine. The tip of the torch is perfectly visible at all times, and the torch does not have to be removed to change the consumables.

Torchmate 3

Available in 4’ x 8’ to 5’ x 10’
Larger sizes can be quoted.

The Torchmate 3 is our top-of-the-line machine. It features a heavy-duty extruded aluminum frame and gantry. The X axis (long axis) is guided by precision industrial cam followers riding on cold roll steel rails or optional hardened and ground rails.

The Y axis (short axis) consists of a precision linear motion multi-rail, supporting a roller cassette with eight 1” diameter needle bearing rollers at right angles to one-another.

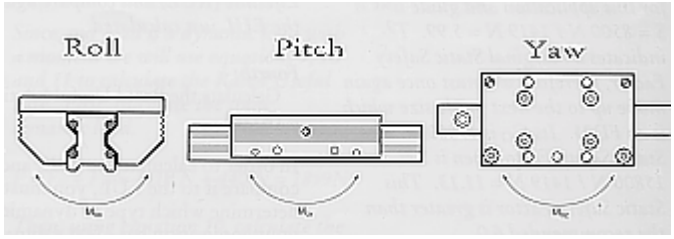
The next several pages describe the Torchmate 3 in detail.

The Y (short) axis is the critical axis when it comes to cut accuracy. This is a major distinction between industrial quality machines and hobby oriented units. The Torchmate 3's Y axis carriage rides on eight precision needle bearing rollers at right angles to each other.

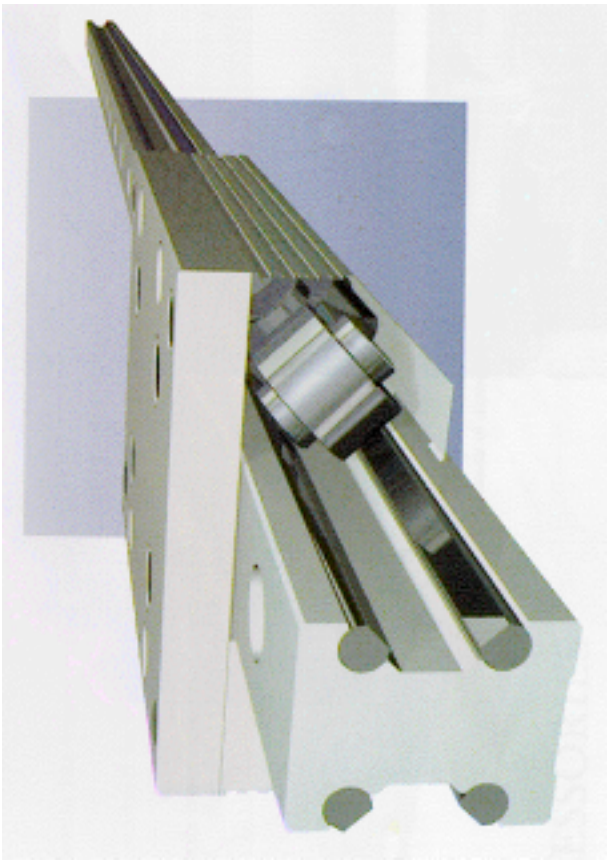
The rollers are calibrated to grip 4 hardened and ground rails with zero clearance. Load capacity is an amazing 4,518 pounds.

The carriage is fitted with replaceable felt wipers at both ends.

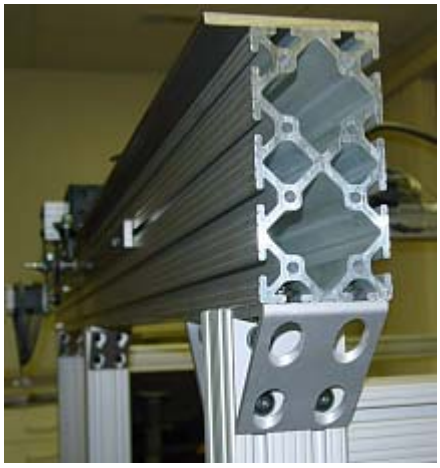
Hardened cap screws secure the rail assembly every 3" to the machine's heavy extruded aluminum carriage. It is possible for a man of normal weight to stand on the carriage and have the machine carry him on both axes.



Above are the three factors that can affect Y axis accuracy. They can be controlled only by the use of components produced with state-of-the-art CNC machining center technology.



RIGHT:
Cut-away view of Y axis roller cassette and rail system.



Massive extruded aluminum frame is diagonally gusseted for its full length. This gives the rigidity of steel with less weight.

Machine is driven from both sides. The special 1 1/4” x 3/8” gear rack is protected by a 1” steel rail overhang.

One side of the Torchmate 3 is eight inches lower than the other to permit the material to be loaded with a forklift. Two motors power the X axis, using a rack and pinion drive train with a timing pulley and belt reduction. This eliminates the backlash that is usually present when gearbox reductions are used.

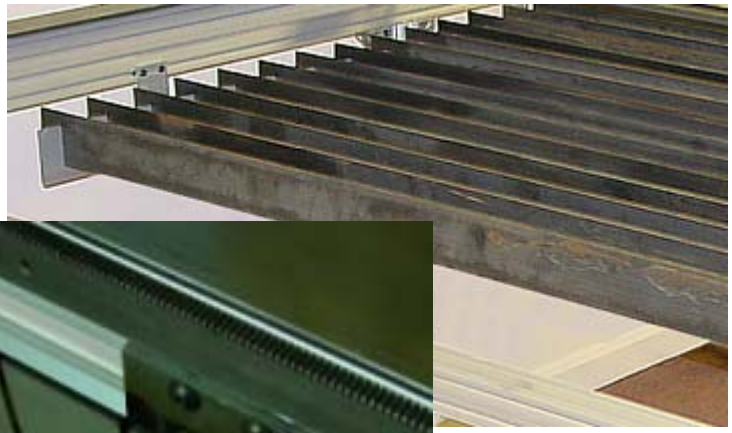
The X axis gear racks are on the outside of the frame, and sit under a 1” shelf to protect them from debris, etc. This eliminates the jamming problems associated with spring-loaded upside-down gear rack designs.

Torchmate 3 includes necessary electronics, motors, cables, and software to create your shapes and run your machine.

Supporting your material

Materials of different weights have different support requirements. We solve this by providing you with laser-slotted slat supports that will accommodate 3/16” wide material support slats, which you purchase locally to save shipping costs.

For steel up to 3/8” thick, suspend the brackets from the machine’s frame with included adaptor brackets. Mount the brackets on a separate table for heavier work. The slotted brackets come with finished Torchmate machines, and are optional for our machine kits. You have your steel supplier cut the 3/16” thick support slats. Be sure the slats you purchase are not thicker than 3/16", as the slots are quite precise.



The Torchmate 3 uses 2 amp, half-stepping electronics, and three 264 oz. in. motors provide a speed range suitable for cutting gauge materials up to oxy-fuel cutting of steel several inches thick. Rapid traverse moves between cuts can be made at speeds up to 250 inches per minute. Torque with the timing pulley reduction is 897 oz. in. per motor.

Assembly time for the Torchmate 3 is approximately two to three hours, depending on whether one or two people are involved. Since it bolts together in sub-assemblies, it can be broken down and moved in even less time.

An optional arc voltage torch height control is available. It maintains the correct tip-to-work distance at all times — even when cutting warped material, or material that is reacting to the heat while being cut. We sell it as a separate unit, so customers can add it at such time as their finances permit. These individuals can get started using a rack and pinion style machine torch holder before upgrading. We also sell the torch height control to owners of other machines for which a similar accessory is not offered.

For those who wish to perform routing or other 3-D work, a computer-controlled Z axis is available. It consists of a physical vertical column with a 4th motor, and additional driver circuitry pre-installed in the power supply. 3-D software permits you to do both raised and recessed lettering, and perform a vast array of other operations. Torchmate owners are doing everything from drilling holes in cribbage boards to applying adhesive on airplane wings in their manufacture.

The Torchmate 3 comes with both our CAD and Driver software module. No other machine selling for less than $50,000 can match the capabilities of these combined packages. For example, the following is only part of what you get in the CAD Module:

Full CAD drawing capabilities
Full automatic nesting of parts
Automatic lead-ins and lead-outs
Automatic kerf compensation
Full text capabilities
Automatic control of travel direction
Automatic cutting of inside parts 1st
Automatically places kerf compensation and lead-ins/outs on the inside or outside of parts, as appropriate.
Automatic array function lets you space bolt holes equally on flanges, etc.
Automatic creation of a specified no. of copies in any desired pattern
Automatic conversion of scanned images
Both inch and metric increments
Complete control over cut sequence
Post analysis function automatically cleans up imported AutoCad dxf files
Vast variety of file importation formats

Torchmate 3 specifications:

Cutting capacity …. 4’ x 8’ or 5’ x 10’ or 6' x 10'
Construction …….. Reinforced extruded aluminum
Power (X axis) ……. Two 264 oz. in. motors
Power (Y axis) ……. Single 264 oz. in. motor
Electronics …… 2 amp. half-stepping
Machine accuracy .. Approximately .0015”
Speed range …… Approximately 3 – 300 IPM
Units of measure … Inch or metric

Y axis ……. Industrial linear motion components
X axis ……. Hardened needle bearing cam followers riding on cold roll steel
Drive ……. Rack & pinion on both axes
Legs …….. Floor-anchor type leg base plates
Weight …….. Approximately 450 lbs.
Rail height … 41” & 33”
Footprint ….. 80” x 132” (4’ x 8’ capacity)

NEW for 2004 - Torchmate 4' x 4' Small Shop System

Despite the obvious advantages of a full 4' x 8' table, many shops lack the floor space for such a large machine. The Torchmate Small Shop System provides a compact, low cost alternative.

The unit has the same mechanical precision, outstanding software, transportability, and versatility as our larger machines, and can be configured to use plasma arc, oxy-fuel, or a router. It can be set in about two hours, and occupies a mere 5x6 foot area of your shop.

The frame and gantry are constructed of the same heavy wall extruded aluminum as our larger machines. The X axis rails are cold rolled steel. The Y axis uses an industrial linear motion slide and cassette, identical to that of the Torchmate 2 and 3. Both sides of the X axis are powered via a driveshaft.

Above: Finished "bolt-together" Small Shop system, shown with Hypertherm manual plasma torch.

Create your shapes in CorelDraw, Autocad, or other drawing program that will export dxf files. Scan line drawings or poster board cut-outs. They can also be created in our CAD Software Module, included with this package.

The CAD software module provides automatic lead-ins and lead-outs, automatic kerf compensation, and full automatic nesting of shapes to compress them into the smallest possible plate area.

You now have a choice of using a regular manual torch or a vertical machine torch. Either our new handwheel operated manual torch holder, or a rack and pinion machine torch holder can be used. Both styles permit you to adjust torch height while cutting.

Torchmate electronics and software can be used with any IBM compatible laptop or desktop computer running on Windows 2000, Millennium, or XP (either version).

Specifications:

Cutting capacity …. 4' x 4'
Construction …….. Reinforced extruded aluminum
Power (X axis) ……. One 135 oz. in. motor-drive shaft
Power (Y axis) ……. One 135 oz. in. motor
Electronics …… 2 amp. half-stepping
Machine accuracy .. Approximately .0015"
Speed range ……. Approximately 3 – 200 IPM
Units of measure … Inch or metric

Y axis ……. Industrial linear motion components
X axis ……. Hardened needle bearing cam followers riding on cold roll steel
Drive ……. Rack & pinion on both axes
Legs …….. Feet have 3/8" holes for bolting down
Weight …….. Approximately 250 lbs.
Rail height … 32 1/4" (cold roll steel)
Footprint ….. 60" x 72" (4' x 4' capacity)

CNC Shape Cutting Machine Kits

Torchmate 3 Kit

Stocked in 4' x 8' and 5' x 10'
Sizes up to 8' x 20' available

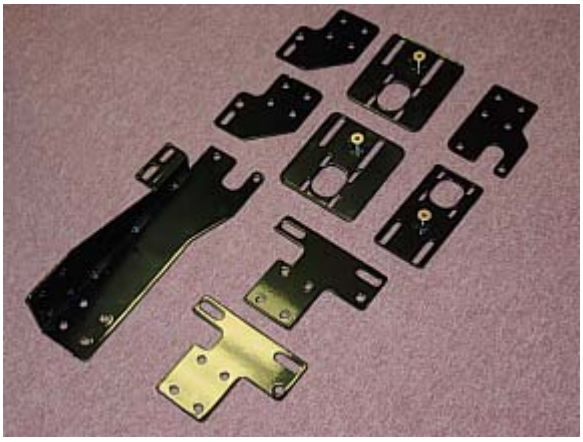
Since Torchmate 3 Kits use dual X axis motors rather than a drive shaft, it is possible to make the finished machine with a capacity as wide as 8 feet.. Call for pricing on these special large capacity kits.

Since many Torchmate customers are professional metal fabricators, it makes sense for them to save money by fabricating their own table and rails. We make this easy, by offering kits that include everything except about $450 worth of steel. Detailed instructions are provided. Your steel prices may vary, depending on your location.

The project is a simple fabrication using rectangular and square steel tubing, and cold roll steel bar. Most customers are able to complete the job in a couple of days or less. The completed unit will be identical to our finished machines, except the table will be steel instead of extruded aluminum.

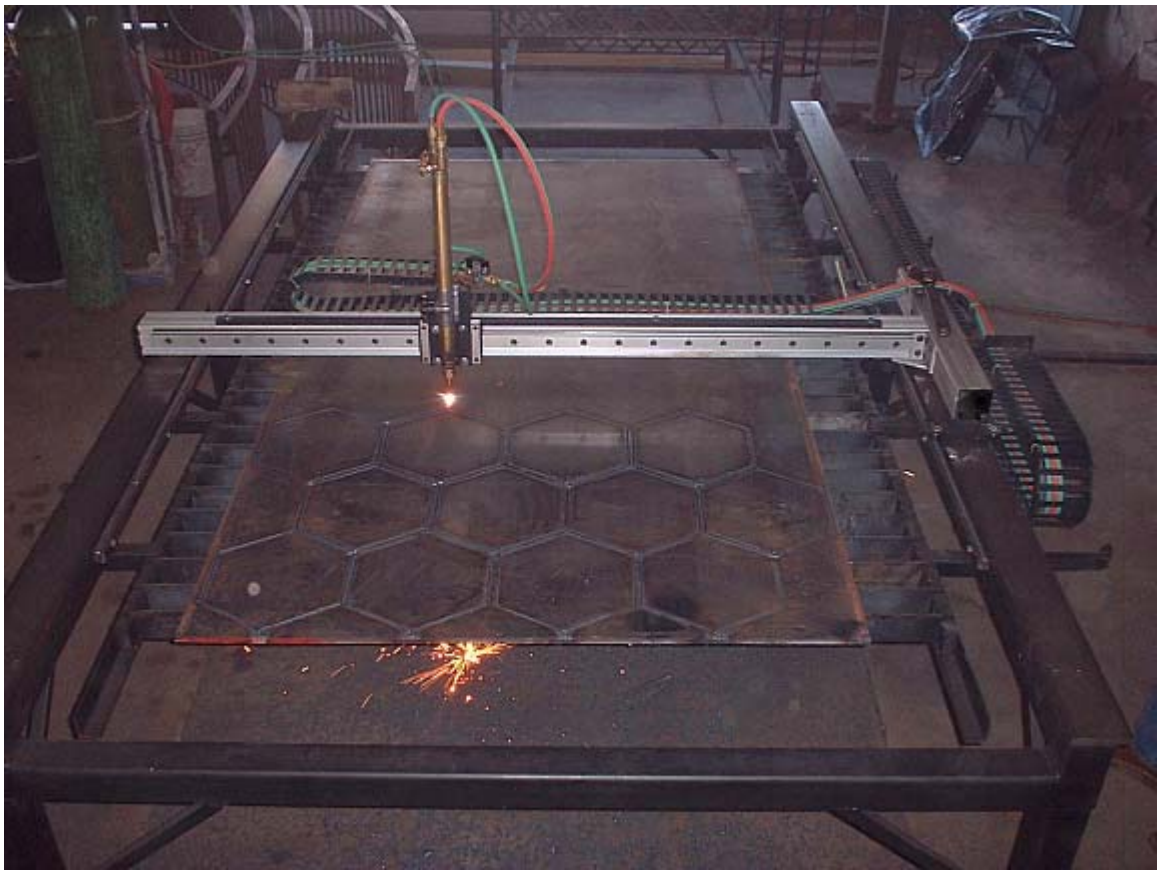
Above: Kit includes everything above the table's rails. For 2004, Torchmate 3 kits include 264 oz. in. motors and all new driver software. Kit includes standard 24 pitch gear rack, not shown in this photo. An optional upgrade to our proprietary "bolt-on" gear rack is available. See accessory pages.

Left: Torchmate 3 steel brackets come powder coated for 2004.



Torchmate 2 Kit

Stocked in 4’ x 8’ and 5’ x 10’
Sizes up to 6’ x 20’ available



The Torchmate 2 uses the same electronics and software as the Torchmate 3. The finished kit will be driven from both sides using a driveshaft. The Y axis linear slide and cassette are the same as that used on the Torchmate 3. You will fabricate the frame and rail system from steel tubing and bar stock you purchase locally. Full detailed instructions are provided.

Above: Here the customer has added commercial cable carrier, available from industrial supply dealers like McMaster–Carr, MSC, etc. Half inch thick steel plate is being cut with oxy-acetylene.

Right: Kit includes everything above the table’s rails except the driveshaft, which you fabricate from 3/4” cold roll round bar. Torchmate 2 kits include 135 oz. in. motors, and the same driver software as the Torchmate 3.

TORCHMATE 2 kits, continued

Many Torchmate 2 owners put a personal touch on their machines. Three examples are shown in the photos at right.

In the top photo, the owner has suspended his cables from an overhead support. In the two bottom pictures the owners have used articulated cable carriers, available from McMaster-Carr (www.mcmaster.com).

Torchmate 2 gantrys use 135 oz. in. motors with a driveshaft powering the opposite side. We supply everything you need to do this except for the 3/4" cold roll round bar, which you purchase locally. You fabricate the X axis rails from cold roll steel bar that you purchase locally, as well.

The 135 oz. In. motors, coupled with a 3.4:1 timing pulley/belt reduction provide sufficient power to carry a person of average weight up and down the rails.

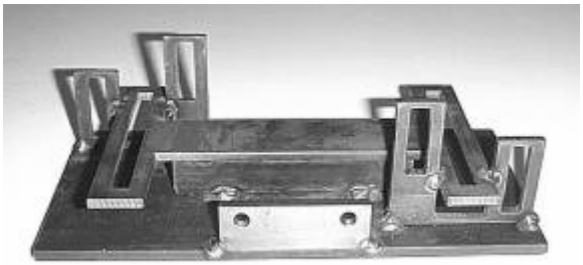
Right:

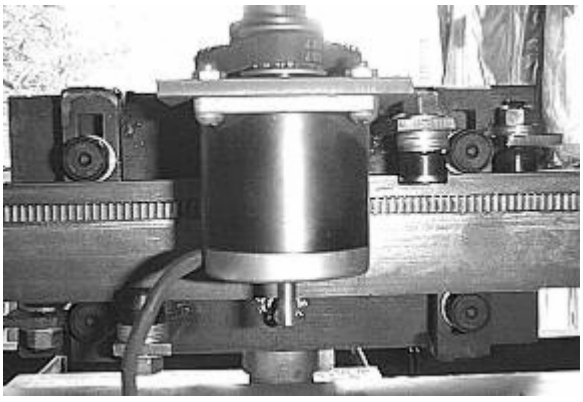
Torchmate 2 gantry kits can be supplied with capacities up to 6' x 20' on special order. Call for information.

Standard Torchmate Kit

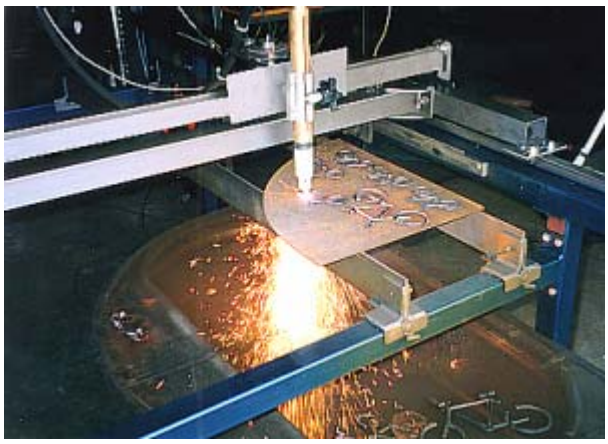
Our Torchmate 1 CNC Gantry Kit allows those on a tight budget to benefit from all the advantages of CNC plasma cutting. Essentially, you are exchanging your labor for a big savings.

You fabricate the entire machine from steel you purchase locally. We provide all the brackets, timing pulleys and belts, gearing, needle bearing cam followers and hardware for the project. You buy only the required steel tubing and cold roll bar.





Below: Completed kit



Available in 4’ x 8’ and 5’ x 10’

Larger sizes possible—Call for info.

The electronics and motors are the same as the Torchmate 2. Completion time is approximately 40 hours.

Left: Unlike the Torchmate 2 and 3, which use an industrial linear motion Y axis roller cassette and rail, you fabricate the Torchmate 1’s Y axis parts.

You supply a piece of 3/4” x 2” cold roll bar to serve as a beam which will be gripped by hardened needle bearing cam followers. You tack weld the supplied slotted brackets to a piece of 5” x 10” x 1/4” hot roll plate that you purchase locally.

Torchmate 1 kits are sold separately from all accessories, so customers on a budget can get started building the table, and add options as finances permit.

Windows-based driver software for all Torchmate machines and kits is new for 2004. Among other new features, it includes the ability to easily back up and start at any line of G-code.

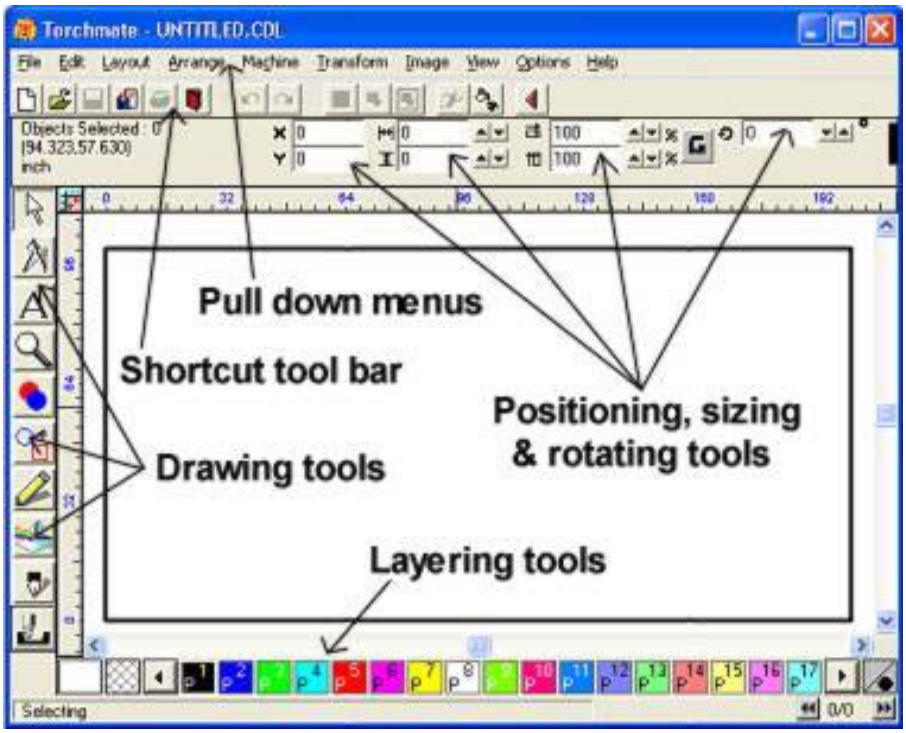
Torchmate Software

Our Torchmate software is made up of two of two separate modules that work seamlessly with each other to design, and then cut your parts. This allows you to design your shapes and dry-run them in the comfort of your office, prior to going out to the shop to cut them. The CAD software module that creates your shapes requires a more powerful and expensive computer than the one in your shop that runs your machine. Keeping the two modules separate permits you to expose a slower, less costly computer to the conditions of your shop, and keep your good computer safe and protected.

Torchmate CAD Software Module

Our CAD Module has functionality beyond anything else remotely in the price range of our Torchmate machines. Its all new "state of the art" features are in stark contrast with competing programs, many of which were created for Windows 3.1, and have gone unchanged for 8 or 9 years.

Compare the appearance of the CAD Module's main screen, shown at right, with other brands. The chart below lists some of the program's capabilities as they compare with other manufacturers' software.

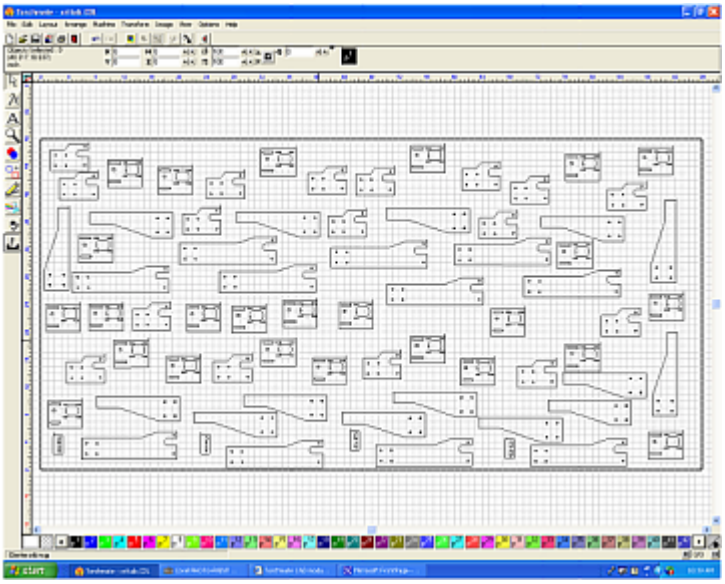


FEATURE	Torchmate	Typical Competitor
Full automatic nesting	YES	NO
Automatic kerf comp.	YES	NO
Metric & inch meas.	YES	NO
Auto lead-ins & outs	YES	Lead-ins only
Scanned images	YES	YES
No of file import formats	48	6
Text editing capability	YES	LIMITED
Torch travel direction control	YES	NO
Creates duplicates in patterns	YES	NO
Full CAD drawing capability	YES	NO
Node editing capability	YES	NO
On-screen context sensitive help	YES	NO
Works in different layers	YES	NO

The features listed at the right are just a fraction of those included in the CAD Module.

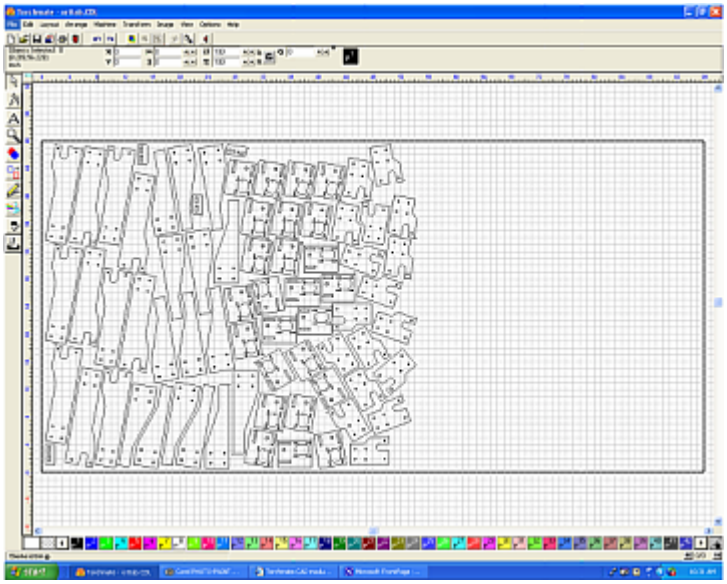
A typical nesting procedure is shown here. The brackets to be cut appear to pretty much fill up the 4' x 8' work surface in the top screen image.

However after automatic nesting has been performed a plate area savings of almost 50% has been achieved. Taking the time to manually move the parts around on the screen would probably be more expensive than the plate that would be wasted without nesting.



The CAD module is so smart that it automatically goes counter-clockwise for inside cuts and clockwise for outside cuts. This produces the best cut edges. It also automatically puts the kerf compensation and lead-ins/outs on the inside of inside cuts and the outside of outside cuts.

It also knows to cut interior parts out before cutting the exterior shape. This keeps the doughnut from falling out of the plate before its hole.



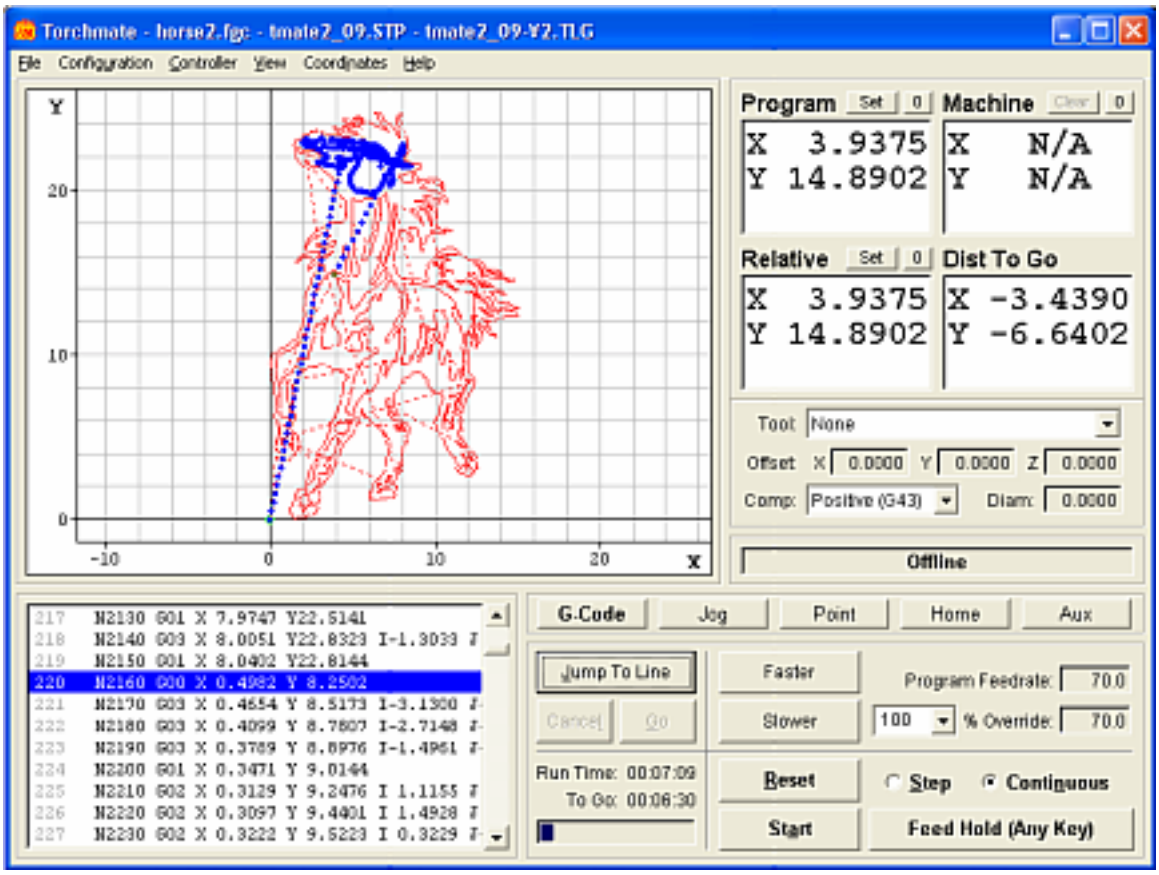
Torchmate Driver Software Module

All new for 2004, the Torchmate driver software module (the program that runs the machine) has numerous new features asked for by our customers.

The most notable of these is the ability to go back and start at any line within a G-code file. This could be done before, but was a somewhat more tedious process.

Competing machines require you to try to jog the torch backward to achieve this. It's pretty much like trying to get a car's automatic window to stop leaving only a crack on a hot day. It takes about 10 tries. This isn't necessary with the new Torchmate program. Another nice new feature is an indicator that estimates the plate processing time for a file.

Torchmate Driver Software Module, continued



Comparison of Torchmate Driver Software Module Features With Those of a Typical Competitor

FEATURE	Torchmate	Typical Competitor
Generates & runs on G-code	YES	NO
Feed rate override with speedometer	YES	NO
Metric & inch meas.	YES	NO
Back up & start at any line of G-code	YES	Jog back only
Scanned images	YES	YES
Keyboard control of torch on & off	YES	NO
G-code editor	YES	NO
On-screen torch path simulation	YES	YES
Real or accelerated time simulation	YES	NO
Program controlled dwell for plasma	YES	YES
Program controlled dwell for oxy-fuel	YES	NO
Digital readout of torch position	YES	NO
Plate processing time estimator	YES	NO
Ability to work in 3-D	YES	NO
Automatic dwell after pausing	YES	NO

Torchmate Accessories

Because Torchmate machines are so versatile, they are used for totally different purposes by customers. Therefore, it is impossible to assemble a single combination of accessories that is suitable for everyone.

There is little point in our including the cost of an arc voltage torch height control in a machine that will be used only with oxy-fuel, a router, a drill, or a mig welding gun. By the same token, the automated Z axis would be of no use to someone planning to use plasma or oxy-fuel only.

The chart below shows the accessories that are supplied as standard equipment on the various Torchmate models, and those that are optional. These accessories are described in detail on the following pages.

Chart Showing Accessories Included With the Different Torchmate Models

Torchmate Accessory	Bolt-together Torchmate 3 & Small Shop	Torchmate 2&3 Kits	Torchmate 1 Kits
Choice of plasma, oxy-fuel, or router machine interface box	Included	Optional	Optional
CAD software module	Included	Optional	Optional
Upgraded gear rack	Included	Optional	Optional
Laser slotted slat support brackets	Included	Optional	Optional
Rack & pinion machine torch holder	Optional	Optional	Optional
Manual torch holder for Hypertherm	Optional	Optional	Optional
Arc voltage torch height control	Optional	Optional	Optional
Automated Z axis for routing (Torchmate 2 & 3 only)	Optional	Optional	Not applicable
Cold rolled steel X axis rails	Included	Customer supplied	Not applicable
Harris 3 hose oxy-acetylene outfit	Optional	Optional	Optional
Solenoid valve for oxy-acetylene	Optional	Optional	Optional
Tube cutting attachment	Optional	Optional	Optional

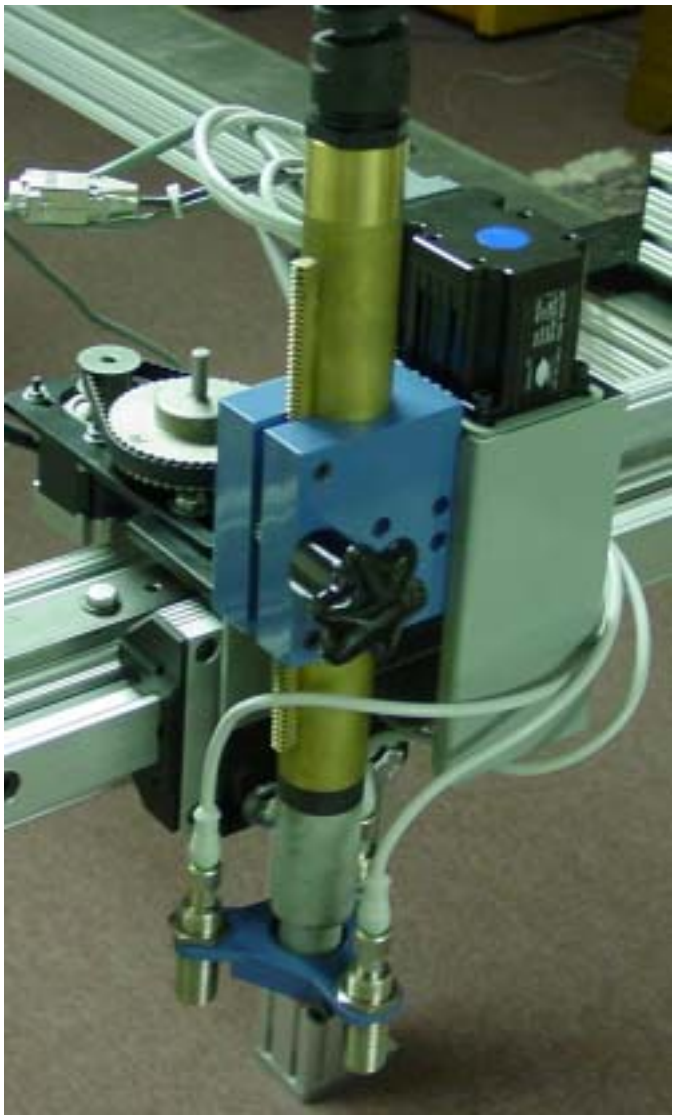
TORCHMATE ACCESSORY DESCRIPTIONS

Automatic Torch Height Controls:

With plasma, it is necessary to make frequent torch height adjustments while cutting, due to irregularities in the surface of the plate, or a lack of levelness. This is not needed in oxy-fuel cutting, since the tip-to-work distance is less critical.

There is no difficulty making manual height adjustments on machines 4' x 4' or smaller, since the torch is always within easy reach. However, this is not generally possible on larger units. The answer is a fully automatic torch height control that maintains a pre-determined tip-to-work distance for you.

Torchmate has two different types of fully automatic torch height controls — one that makes adjustments based on monitoring arc voltage, and another that uses proximity sensors to detect the distance of the torch tip from the material being cut.



Arc Voltage Torch Height Control:

The further the plasma torch is from the work, the greater the voltage must be to maintain the arc. This torch height control monitors the value of the arc voltage, and makes continuous height adjustments to maintain it within a certain window of distance.

This is the preferable method of controlling torch height in most instances, since it is the tip of the torch that is detecting its own distance from the work.

Proximity Sensor Torch Height Control:

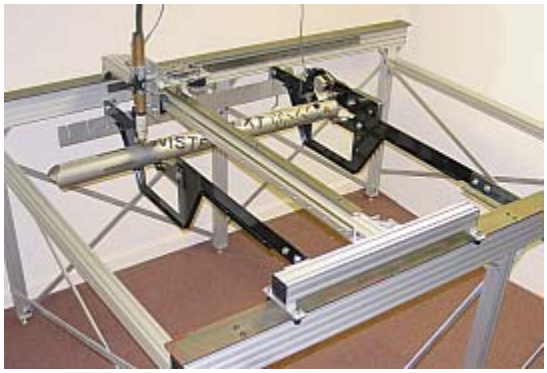
Since the plasma arc must reach a threshold value before it can effectively be monitored, material thinner than about .060" is better cut using our proximity sensor model.

It uses three sensors mounted around the torch tip to monitor the tip-to-work distance and control adjustments in height. Since it doesn't rely on arc voltage, thinner material may be cut. This is the unit pictured here. Other than the absence of the sensors, the arc voltage unit is identical in appearance.

TORCHMATE ACCESSORY DESCRIPTIONS

Tube cutting attachment

The Torchmate tube cutting attachment enables you to perform complex operations on tubing ranging from 1" to 8" in diameter. You can perform saddle cuts in the sides of tubing, fish mouth cuts on the ends, slots, etc.



Rack & pinion torch holder

Torchmate machine interface

Left: Our machine interface box is required for computer control of your tool. We have two versions — one for plasma and one for either oxy-fuel or a router.

The plasma interface turns the plasma torch on and off under computer control. The oxy-fuel interface controls the cutting oxygen on and off on a 3 hose cutting torch. A solenoid valve is also required. This interface will also turn a router on and off.

Plasma cutter manufacturer's machine interfaces are not used in our application.

Automated Z axis

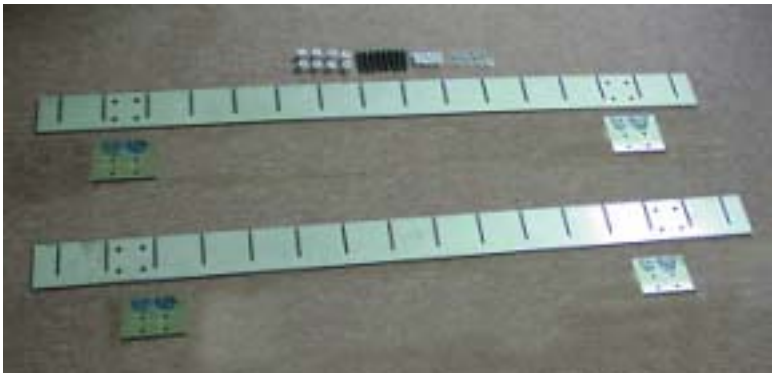
Right: Our optional automated Z axis upgrade includes additional Z axis circuitry, a physical third axis and BobCAD 3-D software, permitting your router to do 3-D work. A CD based tutorial is available as a $250 option.

Since routers vary in diameter and shape, we leave the mounting of your router to you. Here, a mounting bracket was made using a large two piece clamping shaft collar to grip the router body.

We recommend using a 1 1/2 h.p. or smaller router that accepts 1/4" shank router bits.

TORCHMATE ACCESSORY DESCRIPTIONS

Laser slotted slat support brackets



Included with our finished Torchmate 3 and our 4' x 4' Small Shop System are these laser-slotted slat support brackets. They are optional for Standard Torchmate Kits. They come in 4' lengths. Two are used on either side of 8' tables, and two additional 2' pieces are used on 10' tables.

Many customers want the option of being able to cut material thicker than 3/8" plate, which is the maximum weight that can be supported in the manner shown here. They generally fabricate a separate table to support their material, and weld the slotted slat support brackets along either side.

Three hose oxy-acetylene cutting outfit

Above: Harris 3 hose oxy-acetylene cutting outfit includes 3 hose Harris oxy-acetylene machine torch with two tips and hoses, two oxygen regulators, and one acetylene regulator.

A 115 volt a/c activated solenoid valve is available as an option, as well. This controls the cutting oxygen on/off function. The pre-heat flame remains on continuously during the cutting operation.

Upgrade to finished gear rack.

Standard Torchmate Kits come with ordinary gear rack sections that must be tack welded in place. This option is an upgrade to finished gear rack that can simply be bolted to frame.

(Included with Finished Torchmate 3 and Small Shop Machine)

TORCHMATE PRICING – Effective March 1, 2004

FINISHED MACHINES (Includes selected options. See prev. chart)

Torchmate 3 "bolt-together" (4' x 8' capacity-step frame) ……..	**$9,995.00**
Torchmate 3 "bolt-together" (5' x 10' capacity-step frame) ……..	**$10,995.00**
Torchmate 3 "bolt-together" (6' x 10' capacity-step frame) ……..	**$11,595.00**
Torchmate Small Shop System "bolt-together" (4' x 4' capacity) …….	**$ 6,895.00**

MACHINES IN KIT FORM

Torchmate 3 CNC gantry kit (4' x 8' capacity) ……..	**$ 6,995.00**
Torchmate 3 CNC gantry kit (5' x 10' capacity) ……..	**$ 7,495.00**
Torchmate 3 CNC gantry kit (6' x 10' capacity) ……..	**$ 8,095.00**
Call for pricing on larger sizes	
Torchmate 2 CNC gantry kit (4' x 8' capacity) ……..	**$ 5,995.00**
Torchmate 2 CNC gantry kit (5' x 10' capacity) ……..	**$ 6,495.00**
Torchmate 2 CNC gantry kit (6' x 10' capacity) ……..	**$ 7,095.00**
Call for pricing on larger sizes	
Standard Torchmate CNC gantry kit (4' x 8' capacity) ……..	**$ 2,995.00**
Standard Torchmate CNC gantry kit (5' x 10' capacity) ……..	**$ 3,095.00**
Call for pricing on larger sizes	

OPTIONS AND ACCESSORIES (when purchased separately)

Motor cable 10' extensions – price each……..	**$ 20.00**
Torchmate machine interface for plasma ……..	**$ 295.00**
Torchmate machine interface for oxy-fuel or router ……..	**$ 295.00**
Torchmate CAD software module ……..	**$ 795.00**
Arc voltage torch height control ……..	**$ 2,395.00**
Proximity sensor torch height control ……..	**$ 2,395.00**
Automated Z axis for routing (Torchmate 3) ……..	**$ 1,899.95**
Automated Z axis for routing (Torchmate 2 & Small Shop Machine) ..	**$ 1,399.95**
Harris 3 hose oxy-acetylene cutting outfit ……..	**$ 895.00**
Solenoid valve ……..	**$ 295.00**
Finished gear rack upgrade – 4' x 8' capacity machines ……..	**$ 250.00**
Finished gear rack upgrade – 5' x 10' capacity machines ……..	**$ 300.00**
Laser slotted slat support bracket (per 48" section) ……..	**$ 47.50**
Torchmate tube cutting attachment ……..	**$ 1,495.00**
Rack & pinion knob-controlled machine torch holder ……..	**$ 149.95**
Set of three 15' extension cables for Torchmate 3 ……..	**$ 60.00**
Set of two 15' extension cables for Torchmate 2 ……..	**$ 40.00**

MISCELLANEOUS

Rhinoceres 3-D software (visit www.torchmate.com/rhino3d) ……..	**$ 795.00**
Design2Fab HVAC software (visit www.torchmate.com/hvac) ……..	**$ 1,995.00**
BobCadCam 3-D software vers. 8 (visit www.torchmate.com/bobcad)	**$ 795.00**
Torchmate pantograph machine construction plans ……..	**$ 40.00**
(visit www.torchmate.com/pantograph.htm for information)	

Torchmate Sales
(775) 673-2200 West Coast time

Call for Shipping Information

HYPERTHERM PLASMA CUTTERS Call for pricing

Many plasma cutters are available with one of two different kinds of torches. The most familiar style is a manual torch, with approximately a 70 degree angle built into its head. This permits it to be easily held in one's hand.

The other style torch is designed for use on a cutting machine. Called a machine torch, it is a vertical, barrel shaped torch, with a gear rack built into its side to facilitate raising and lowering it. Machine torches cost more than manual torches, but are necessary for satisfactory machine cutting. Machine torches permit easy raising and lowering of the torch via a knob-controlled torch holder. This allows you to make tip height adjustments on the fly, and change consumables in the middle of a cut sequence.

Left: Plasma cutter pictured with manual torch.
Right: Plasme cutter pictured with machine torch.

Far Right: Typical machine torch holder.

Plasma cutters come with torch, ground cable & clamp, & spare consumables.

Powermax 190c
(Manual torch only)

Compact unit 1/8" capacity unit with built-in air compressor -- ideal for portable use. Operates on 115 or 230 volt current. Output - 12 amps. Weight - 46 lbs.

Powermax 380
(Manual torch only)

Portable machine with recommended 1/4" capacity. Operates on 115 or 230 volt current. Output - 27 amps. Weight - 55 lbs

Powermax 600 Available with either 25' manual torch or 25' machine torch

Portable unit with recommended 3/8" capacity. Operates on 230 volt current. Output - 40 amps. Weight - 47 lbs.

Powermax 1000 Available with either 25' manual torch or 25' machine torch

Heavy duty machine with recommended 3/4" capacity. Operates on 230 volt current. Output - 60 amps. Weight - 83 lbs.

Powermax 1250 Available with either 25' manual torch or 25' machine torch

Heavy duty machine with recommended 7/8" capacity. Operates on 230 volt current. Output - 80 amps. Weight - 96 lbs.

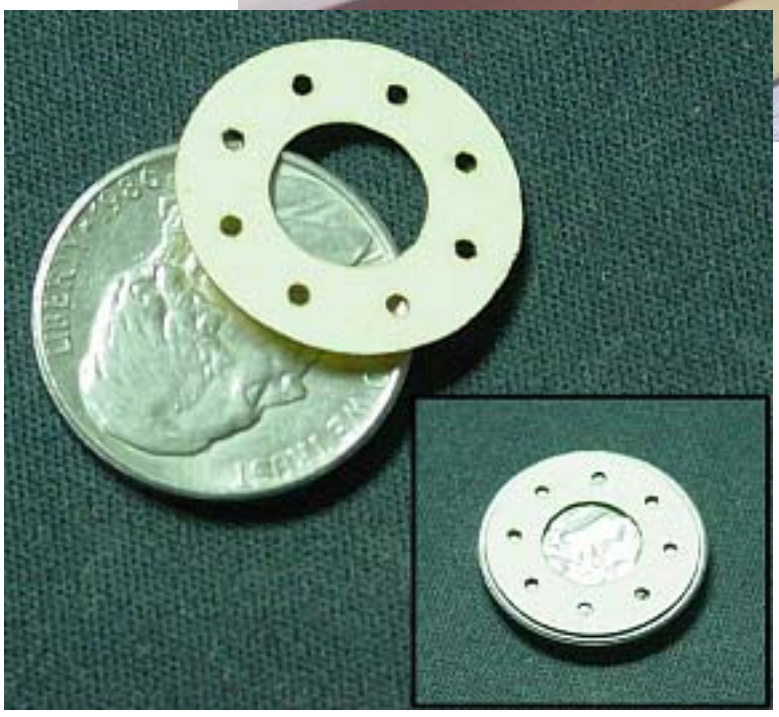
Powermax 1650 Available with either 25' manual torch or 25' machine torch

Extreme duty machine with recommended 1 1/4" capacity. Operates on 3 phase current. Output - 90 amps. Weight - 128 lbs.

TORCHMATE RESEARCH & DEVELOPMENT

When people ask about the accuracy of our machines, we find it almost amusing. To make our point, we mounted a 60 watt laser on a standard Torchmate 3. This low power laser, while not potent enough to cut steel, produces a gap (kerf width) of about .002" as opposed to about .060" for plasma.

Take a look at the kind of detail that the machine is capable of producing in card stock at about 3 watts. Competing manufacturers of CNC plasma systems who make claims about the accuracy of their machines have never tried them out with a laser, and have no clue as to their inherent accuracy.




AMERICA

TORCHMATE RESEARCH & DEVELOPMENT, continued

We hastily mounted a MIG gun onto our Torchmate 3, and laid down the bead shown here.

Prototype extruded aluminum pantograph machine with magnetic tracer.

Pantograph machines were first patented in 1917, and are obsolete in today's world of CNC cutting systems. However, they do produce results superior to manual cutting.

We produced pantograph machines from 1979 though 1998, when we dropped them to focus exclusively on our CNC machines.

We have no immediate plans to produce units like that pictured here, and put this together just for fun.

TORCHMATE RESEARCH & DEVELOPMENT, continued

Here we are testing a 5' x 10' capacity Torchmate 3 with a Burny Phantom ST touch screen CNC controller equipped with brushless servo motors and low-backlash planetary gearboxes. Also shown is an Innerlogic Inova arc voltage torch height control.

Our purpose was to determine any differences in performance between these high-end components, typically found on $100,000 & up machines, and our own cnc controls. We know of no other manufacturer remotely in our price range that goes to these lengths to ensure that customers get the maximum in performance, reliability, and ease-of-use.

While we could not see any difference in the quality of the pieces we cut, the Burny Phantom controller and Innerlogic height control are sweet items, which we may offer as options for the Torchmate 3 as a $35,000 alternative for customers considering the purchase of a $100,000 plus machine.

What's the next step?

Let's assume that you have read this catalog thoroughly, and decided that a Torchmate system is the solution for you. How do you proceed from here?

The next step is for you to call our toll-free sales hot line to discuss your needs, and receive a firm quote for the exact machine and accessories that meet your requirements. To prepare for your telephone session with us, you will need to consider the following questions. We will help you answer them.

What process or processes do you plan to use — plasma, oxy-fuel, routing, drilling, etc.?

What is the maximum size of the material you plan to place on the table?

What types and thicknesses of material will you be cutting?

Do you have suitable shop space available, and how much of it can you devote to your Torchmate system?

How will you load the material to be cut onto the table?

Most Torchmate owners use one computer in the office to create shapes, and another in the shop to run the machine. What computers will you use?

What is your budget for your CNC system? Torchmate lets you start with a basic configuration, and add accessories as the system pays for itself.

We look forward to talking with you!

Torchmate is manufactured by:
Applied Robotics, Inc.
108 Jordan Taylor Lane
Harwood, Maryland 20776

Sales and Technical Support:
Reno, Nevada
Toll-free sales no.: **1-866-571-1066**
Non-U.S. callers: **1-775-673-2200**

Sales e-mail:
sales@torchmate.com

Tech. support e-mail:
support@torchmate.com