

# PCNC 770

**PERSONAL CNC**

PRODUCT DATASHEET



**THE PCNC 770™** was designed from the ground up as a versatile CNC mill for the materials you cut the most. With a 10000 RPM spindle and 130 IPM maximum feedrates, the PCNC 770 is a top performer when it comes to aluminum, light metals, plastic – but still up to the task when the going gets tough: when you need to cut steel, titanium, or other difficult materials, just shift the belt drive to low and you have plenty of torque for the toughest materials. Combined with a space-saving footprint, basic household 115 VAC power requirement, and innovative moving features, the versatile PCNC 770 is a perfect fit, no matter the size of your shop.

The PCNC 770 is an affordable precision machine, designed for R&D, education, and hobbyists alike. It's got enough power and speed to get the job done, but with the flexibility that you need to adapt to a wide variety of projects – prototyping, model making, customization – even light production.

Tormach's unique and proven design combines cast iron construction with PC-based motion control technology to provide unprecedented affordability and value. Purchasing a Tormach PCNC gives you the peace of mind that each PCNC is manufactured to industrial quality standards and held to those standards by a 32 point inspection, on-site at the factory. And don't forget that our best-in-industry support will be there for you, by website, email, or phone.

- Table Size: 26" x 8"
- Table Slots: 3 T-Slots 5/8"
- Travel: 14" x 7.5" x 13.25" (X, Y, Z)
- Spindle Nose Diameter: 3 3/8"
- Spindle Taper: R8
- Spindle Construction: Cartridge with spindle lock
- Spindle Drive: Vector Technology 750W continuous, 1300W peak
- Spindle Speed: 175 to 10200 RPM
- Transmission: Poly V-Belt Drive, 2 ratios
- Weight: 662 lbs. net, 800 lbs. gross
- Shipping Dimensions: 42" x 45" x 49"
- Work piece: 500 lbs. Maximum
- Max Feed Rate: 130 IPM (X,Y); 100 IPM (Z)
- Axis Drives: High Performance Stepper Motors with Microstepping Drivers
- Controller: Tormach Embedded Controller with Mach-OS or PC with XP, Vista, or Win 7
- Control Software: Customized version of Mach3, license included
- Power requirements: 115 VAC single phase, 50/60Hz
- Operating Temperature Range: 45-100°F (7-38°C)
- Integrated Z-axis Power Release Brake
- Machine Moving Kit Accessory available
- Features:
  - 13 point Lubrication with Single Shot Lubrication Pump Standard, Automatic Lubricator Optional
  - PTFE Bonded Slideways
  - ISO/DIN P4 Grade Ballscrews





## OVERVIEW

The PCNC 770 is designed for real work. The machine has the strength, power, and accuracy needed to cut serious materials. Milling circuit boards, aluminum, and engineering polymers is a breeze with a machine that is built to cut materials like steel, iron, stainless steel, and titanium.

With the PCNC 770, Tormach continues to refine our inventive approach to small CNC mills. We base our designs on open-architecture principles. The control system uses standard industrial components and interfaces and there are no proprietary drive train components. This minimizes initial investment, reduces maintenance cost, and virtually eliminates any risk of obsolescence.

Tormach strives to provide you with the best possible value at a low cost of ownership. The machines are built to stock, not to order, and we pass the cost savings on to you. Our designs are modular with user-installed options and accessories. This means you buy only what you need. You can get

the ultimate system now, or build it over time. Either way you have the security of knowing that your foundation machine is the best in class and pre-engineered for expansion. Tormach is famous for exceptional technical support backed by documentation, telephone support, and warranty service on replacement parts.

## DESIGN DETAILS

### Proven Design

The PCNC 770 utilizes the same proven design principles as Tormach's industry leading PCNC 1100 Series II mill, but in a space economizing smaller package. Each mill is built from over 650 lbs. of cast iron and steel that is precisely placed to achieve maximum frame rigidity while still maintaining a size and shape that's manageable in the small shop or lab.

Motion control is provided by high performance stepper motors with microstepping drivers. The stepper motors drive precision ground P4 grade ball screws, giving each axis repeatable and accurate motion resolution.

The sliding dovetailed ways are hand-scraped and designed to withstand high loads and dampen vibrations. The ways have bonded PTFE filled acetal surfaces. Similar to brand name compounds such as Turcite® or Rulon®, PTFE compounds provide low friction and long life.

Unlike other small footprint mills, the PCNC 770 has tapered gibs instead of an inferior plate and set screw design.

The single shot lubrication system is plumbed to all slideways and ball

nuts, with machined oil distribution channels in every way surface. There's even an optional automatic lubricator that for easy set-and-forget maintenance.

With the PCNC 770, we have again chosen state-of-the-art sensorless vector technology in the spindle drive, providing exceptional speed and torque characteristics. The drive's quick acceleration/deceleration improves performance while extending capabilities to demanding processes such as tension-compression tapping. The spindle uses a simple, low – maintenance poly V belt driven induction motor with two belt ratios. The spindle drive provides infinite speed control of 175 to 3250 RPM in the low ratio, and 525 to 10200 RPM in the high ratio to cover your needs from tapping to finishing.

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**A PATENT-PENDING MOVING KIT MAKES DISASSEMBLY OF THE PCNC 770 SAFER AND EASIER.**

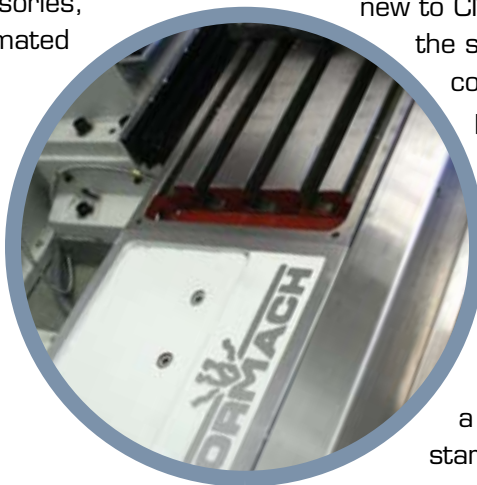
## Flexibility

A unique feature of the PCNC 770 is the moving kit feature that allows transportation of the machine as subassemblies for increased portability. Tormach's patent pending design allows for assembly and disassembly of the mill if there is ever a need to move. This is only CNC mill designed specifically for machinists with basement shops.

Each mill features a R8 spindle with a 3 3/8" nose diameter that is common to popular Bridgeport-style manual mills. This can be used with conventional R8 tooling or with the new standard in small mill tooling, the **Tormach Tooling System®** (TTS) quick-change tooling.

The PCNC 770 is at home in both manual and CNC operation. The mill is easily controlled for simple off-the-cuff manual maneuvers like drilling or facing, and just as easily switched to computer control for complex 3D surface contouring. Our inexpensive electronic hand wheel makes manual milling a snap.

Each PCNC comes standard with a multipurpose input port. This port can be configured to integrate a variety of accessories, including an automated tool setter and digitizing probe.



THE PCNC 770 FEATURES AN INTEGRATED CONTROL CONSOLE.

## Control

The PCNC 770 integrates a PC-based controller with a hard wired console for safety and convenience. The console includes:

- Machine Start
- Emergency Stop
- Spindle Key Switch Lockout
- Spindle Auto/Manual
- Spindle Speed and Direction
- Coolant On/Off/Auto
- Computer On/Off
- LED Status Indicators
- Multipurpose Input Port

The machine control software is easy to learn yet comprehensive in functions and features. Those new to CNC will appreciate the simplified, single control screen which provides clear and simple graphics with all of the buttons and information displays needed to run most programs. It's a great way for a beginner to get started.

Advanced users will appreciate the comprehensive control screens, which include information displays for all functions and features.

Software features include:

- Conversational Operations
  - Engraving and Text Milling
  - Pocketing
  - Drilling Circular Patterns
  - Drilling Grid Patterns
  - Keyway Cutting
  - Thread Milling
  - Plus many more
- Integrated support for reversing tapping heads
- Integrated support for Tormach® touch probe
  - One button - center to vise corner
  - One button - center to a hole
  - Center on arc segment
  - Automatic work height setting
- Automatic tool setting, with Tormach® tool setter option
- Code Length to 10 million lines
- Online Code Editing
- Automatic Multi-pass with Z depth management
- 3D Part Program and Path Graphics
- Zoom, Rotate, and Jog Follow Graphics
- Programmable Spindle Speed
- Start at any line
- Single Line Mode
- Programmable Tool Change Position
- Machine Diagnostic Displays
- Job run time estimator
- 253 Entry Tool Table
- Large MDI with MDI History Recall
- Program Simulate Run
- 4th Axis Control
- Online G and M Code Help
- On screen diagnostics

## ABOUT TORMACH

The people at Tormach are dedicated to delivering tools, accessories, and components of unprecedented value in the world of CNC and motion control. Whether you're involved in R&D, education, short run production, or simply an entrepreneur with an idea, you need to make things. Tormach products allow you to make what you need easier, quicker, and more affordably. We want to help make your goal a reality, to enable your ideas. Our mission is to empower people who make things. Whether you're cutting parts with our machine tools or building your own equipment using our components, our focus is to manifest your concepts and help you bring your ideas into reality.

## ORDERING, PAYMENT & SHIPPING

Quotations can be requested online using our web based quotation system, or through FAX, email, or over the phone. Machines and accessories can also be ordered using our secure web shopping cart. Payment can be made by check, credit card, or wire transfer. Machines and machine stands are shipped via truck freight in North America, while accessories are normally shipped via package service (UPS, USPS, FedEx). Tormach ships worldwide in cooperation with established international freight forwarding companies.

## WARRANTY AND SUPPORT

Machines and accessories are warranted for 12 months. Warranty service is limited to repair or replacement of components with telephone support, there is no on-site field service staff. Replacement parts are stocked at our Wisconsin facility. **Additional information is available at [www.tormach.com](http://www.tormach.com).**



## ENABLING YOUR IDEAS

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**Before TTS** (Tormach Tooling System®) came along, dual contact tool holder technology was only available on high end 7/24 tapers. Our affordable TTS tool system brings the advantages of dual contact geometry to your R8 or Morse taper spindle by referencing both the spindle taper and spindle face. TTS is a precision tool holding system that cost about the same as standard R8 tooling but offers significant improvements in rigidity, required tool clearance, ease of tool change, and Z height repeatability. Our expansive TTS line includes tool holders, tapping heads, insertable carbide tooling.



## TTS TOOL SETS

Getting started with TTS is easy with these TTS package sets. Each set includes a selection of common tool holders. The CNC Operator's Sets also include an offline tool height measurement system.

**PN 30188:**  
**MANUAL OPERATOR'S SET**

**PN 30189: CNC OPERATOR'S SET**

**PN 31106: TTS METRIC SET**



## TTS TOOL HOLDERS

Tormach's TTS quick change tool holders are the recognized leader in affordable quick change tooling for small CNCs. We offer a variety of styles for performance that fits into your budget.



## SET SCREW HOLDERS

Affordable tool holders for general milling and facing. Set screw design engages the Weldon flat of the cutting tool for a secure hold. Available sizes: 1/4", 5/16", 3/8", 1/2", 6mm, and 10mm.



## JACOBS TAPER HOLDERS AND DRILL CHUCKS

Jacobs taper adaptors are used for mounting drill chucks. Available in JT1, JT33, JT2, and JT6 sizes. Matching chucks available in both standard and keyless styles.

## ER20 COLLET HOLDERS

ER20 are industry standard (DIN 6499) self extracting collets. These are ideal for all tool holding applications, including milling, drilling, reaming. Collets are available in 1/64" increments from 1/32" to 1/2" in diameter and 1mm increments from 1mm to 12mm diameter.

**PN 31653: ER20 TTS TOOLHOLDER (DOES NOT INCLUDE COLLETS)**

**PN 30584: ER20 COLLETS, 30 PIECE SET**

**PN 30596: ER20 COLLETS, 15 PIECE SET**

Individual collets available as well, visit [www.tormach.com](http://www.tormach.com) for complete listing.



## BORING TOOLS AND BARS

Boring tools are for precision finishing operations on large diameter holes, and cylinders. The TTS adaptor fits to 7/8-20 UNF mounted heads or other tooling with the 7/8-20 thread. Boring head, carbide boring bar sets, and head adaptor are sold separately.

**PN 30247: TTS MOUNT FOR 7/8-20 THREADED BORING HEAD**

**PN 30248: 7/8-20 THREADED BORING HEAD**

**PN 30249: 1/2" SHANK CARBIDE FACED BORING BAR SET, 9 PIECES**



## TAPPING HEADS

Tormach offers two styles of tapping heads that incorporate our TTS geometry for quick change tools. Auto-reversing tapping heads make quick work of tapped holes since they don't require spindle reversal to back out the tap. Tormach makes tapping easy to do through the integration of pre-programmed tapping macros in the PCNC control software – simply specify the tap pitch and call the macro. Our Tension/Compression tapping head combines quiet, robust operation with versatility between 9 different quick-change tap collets.



**A) PN 30612: LARGE AUTO-REVERSING TAPPING HEAD**

**B) PN 30613: SMALL AUTO-REVERSING TAPPING HEAD**

**C) PN 31163: TENSION/COMPRESSION TAPPING HEAD; INCLUDES (D) QUICK-CHANGE TAP COLLETS**

## MODULAR INSERT TOOLS

Tormach's Modular Insert Tooling is an interchangeable system of carbide insert cutters, cutter heads, and TTS cutter mounts for the ultimate in adaptable quick-change cutting tools. With replaceable cutting inserts and a variety of tool lengths and cutter head styles available, machinists can now build a tool custom tailored to their milling application.



Available Options include:

**FACE MILL: 38MM**

**END MILL: 16MM, 21MM, 25MM**

**CENTER CUTTING END MILL: 17MM, 25MM**

**TOROIDAL MILL: 16MM, 25MM**

**BALL MILL: 8MM, 16MM**



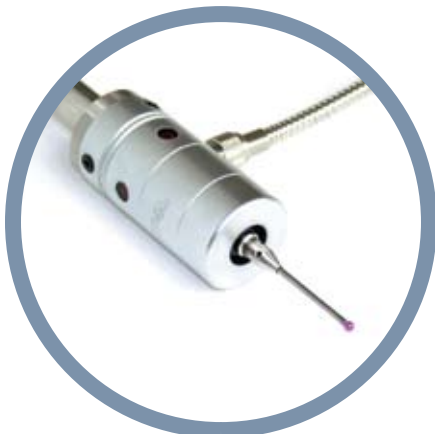


## TTS TOUCH TOOLS

The touch tool allows you to set your work offset (i.e., touch off) with excellent accuracy and without the risk of colliding a tool with the work. Available in both mechanical and digital indicator styles with 0.0005" graduation.

**PN 31283: TTS TOUCH TOOL, MECHANICAL INDICATOR**

**PN31284: TTS TOUCH TOOL, DIGITAL INDICATOR**



## DIGITIZING PROBE

Tormach's precision digitizing probe serves a variety of functions. For reverse engineering it can be used for anything from collecting a few position points on a part, to building a complete 3D model from an automated touch matrix. For setup operations the PCNC software

includes one click buttons that will allow the probe to be used to center the machine to a hole, find the center of an arc, center of a rectangle, or the corner of a vise. It can even be used to zero the machine height to your work. The probe has the same mount style as TTS tools, thus allowing quick change and full compatibility.

**PN 30668: ELECTRONIC DIGITIZING PROBE**



## AUTOMATIC TOOL SETTER

The Tormach Tool Setter is typically used to measure and set tool lengths and Z-axis work offsets. When contacted by a tool it works with the machine control software to record position. The tool setter enables fast and accurate measurement of tools and setup of jobs. It also has the advantage of setting work offsets with no risk of chipping the edges of high performance carbide mills. The tool setter cable has a male 5 pin DIN connector. This connector will join to the auxiliary socket provided on the PCNC operators control panel. The Tormach Tool Setter also comes with a sturdy storage case.

**PN 30669: TOOL SETTER**



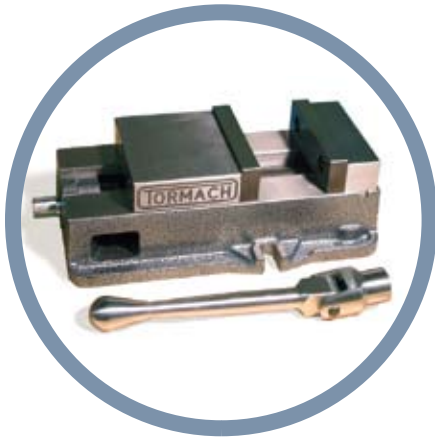
## CNC SCANNER™

CNC Scanner™ is a revolutionary product for 2D reverse engineering. It allows you to take a dimensionally accurate high resolution mosaic image by leveraging the precise motion of the mill. These images can be used to accurately determine hard-to-measure dimensions or traced to recreate engineered drawings. CNC Scanner includes a TTS mounted USB microscope and Tormach CNC Scan CAD™ software for measuring and 2D reverse engineering.

**PN 31456: CNC SCANNER**

**PN 31738: TORMACH CNC SCANNER DELUXE**

**PN 31453: TORMACH CNC SCANNER CAD (SOFTWARE ONLY)**



## MACHINING VISE

A good vise is the foundation for your work on the PCNC. Our 5" vise is the perfect size. A nickel plated screw with needle bearings and turned steel handle provide positive clamping pressure with minimum effort. Each vise includes precision ground hardened jaws, while optional soft jaws make for handy custom fixtures and step jaws avoid the need for parallels.

**PN 30553: 5" VISE**

**PN 30662: ALUMINUM SOFT JAWS**

**PN 31110: STEEL STEP JAWS**



## ELECTRONIC HAND WHEEL

Manual operations and setup are a breeze with this electronic handwheel. More convenient than

a conventional single wheel, the Tormach jog/shuttle controller contains two wheels: a conventional electronic inner wheel for precision positioning, and outer variable speed wheel for quick jogging. Whether you are manual milling, running rapids, or dialing in for a 0.0005" touch off, the jog/shuttle is quick and efficient. Includes X, Y, Z, and A (4th axis) selection buttons and a configurable step size button. USB plug-in with 3 meter cord.

**PN 30616: JOG/SHUTTLE CONTROLLER**



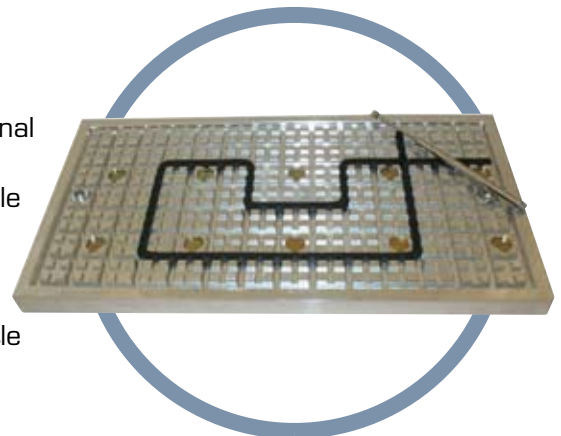
## HIGH SPEED SPINDLES

Our high speed spindle kits are precision german-made die grinders mounted as a companion spindle. The result is a variable speed side mounted spindle for engraving, circuit board milling, or high speed finishing. You can also purchase the Universal Arm separately so you can mount a router, laminate trimmer, or other tool.

**PN 30478: PROXXON 100W**

**PN 31483: KRESS 800W**

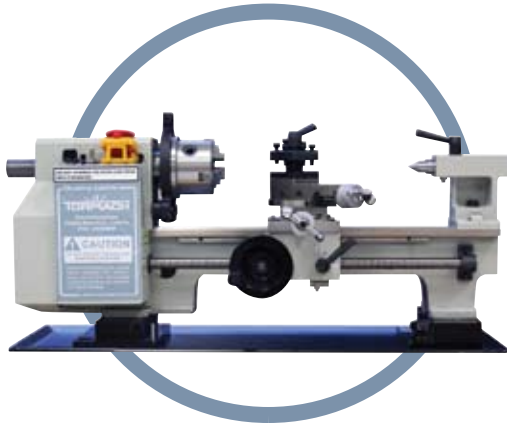
**PN 30387: UNIVERSAL ACCESSORY ARM**



## VACUUM TABLE

Our vacuum table is perfect for those tough to clamp parts. Engraving and light cutting on thin or flat workpieces is no problem with our custom-sized table. Each aluminum table is precision milled and has an integral vacuum channel. The table size matches the work envelope of the PCNC and is quickly and securely attached the mill table with bolts and T-nuts.

**PN 31185: VACUUM TABLE KIT**



## DUALITY LATHE™

The Duality Lathe™ is a patented dual function lathe accessory. It clamps to the mill table much the same as a machinist's vise. When mounted on the mill table, it becomes a full function CNC lathe. The Duality Lathe includes CNC lathe control software that provides manual, semi-automated, and fully automated CNC control. All standard operations are supported, including turning, facing, parting, even threading. When removed from the mill and set on your workbench, the Duality Lathe functions as a conventional manual mini lathe, with all the functionality you would expect. As either a CNC or manual lathe, the Duality Lathe is always ready for your small turning jobs.

**PN 30387: DUALITY LATHE**

An optional 4th Axis kit extends the functionality of the Duality Lathe by providing continuous 4th axis CNC motion.

**PN 31702:  
DUALITY LATHE  
4TH AXIS**



## CAD/CAM SOFTWARE

In addition to the machine control software, each machine is shipped with CAD and CAM software.

These are entry level programs provide everything you need to create simple drawings and then create the G code programs that run your mill. Tormach also offers more comprehensive CAD and CAM programs such as Alibre Design Expert, TurboCAD/CAM, and SprutCAM.

The more advanced programs provide added features needed to create complex designs. They'll support programming of Tormach® accessories such as the 4th axis or Duality Lathe.

Tormach is the leader in CAM support with personal SprutCAM support and online video tutorials to get you quickly programming with CAM. We are committed to your success and are the only integrated provider of both CAM and mill hardware support in our class.

## Tormach CNC WORKSHOPS

Our workshops are hands-on instruction in CNC fundamentals. Attendees gain practical experience in CNC programming, machine control, and metal cutting and will also be introduced to CAD/CAM design and programming concepts. The workshops are a survey of CNC manufacturing from concept to chip cutting and are designed to give you a running start with your PCNC.

**CNC Fundamentals (3-days)**

**SprutCAM Basics (1 day)**

Visit [www.tormach.com/workshops](http://www.tormach.com/workshops) for upcoming dates.

