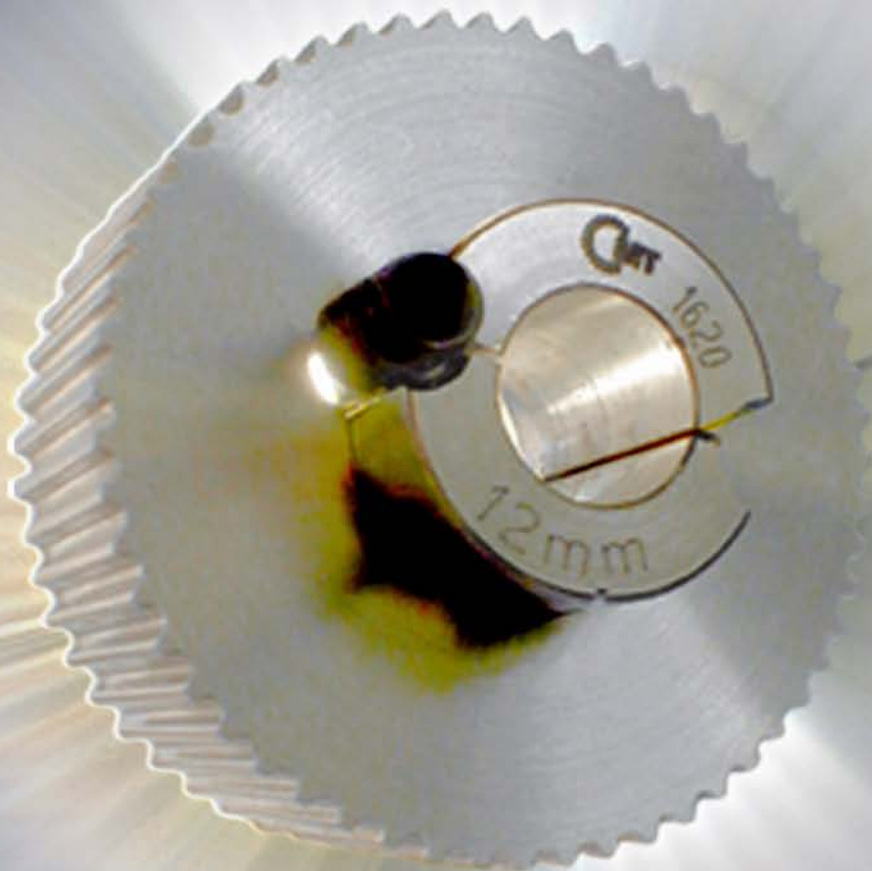


CONCENTRIC MAXI TORQUE

A primer on the
technology and
its application

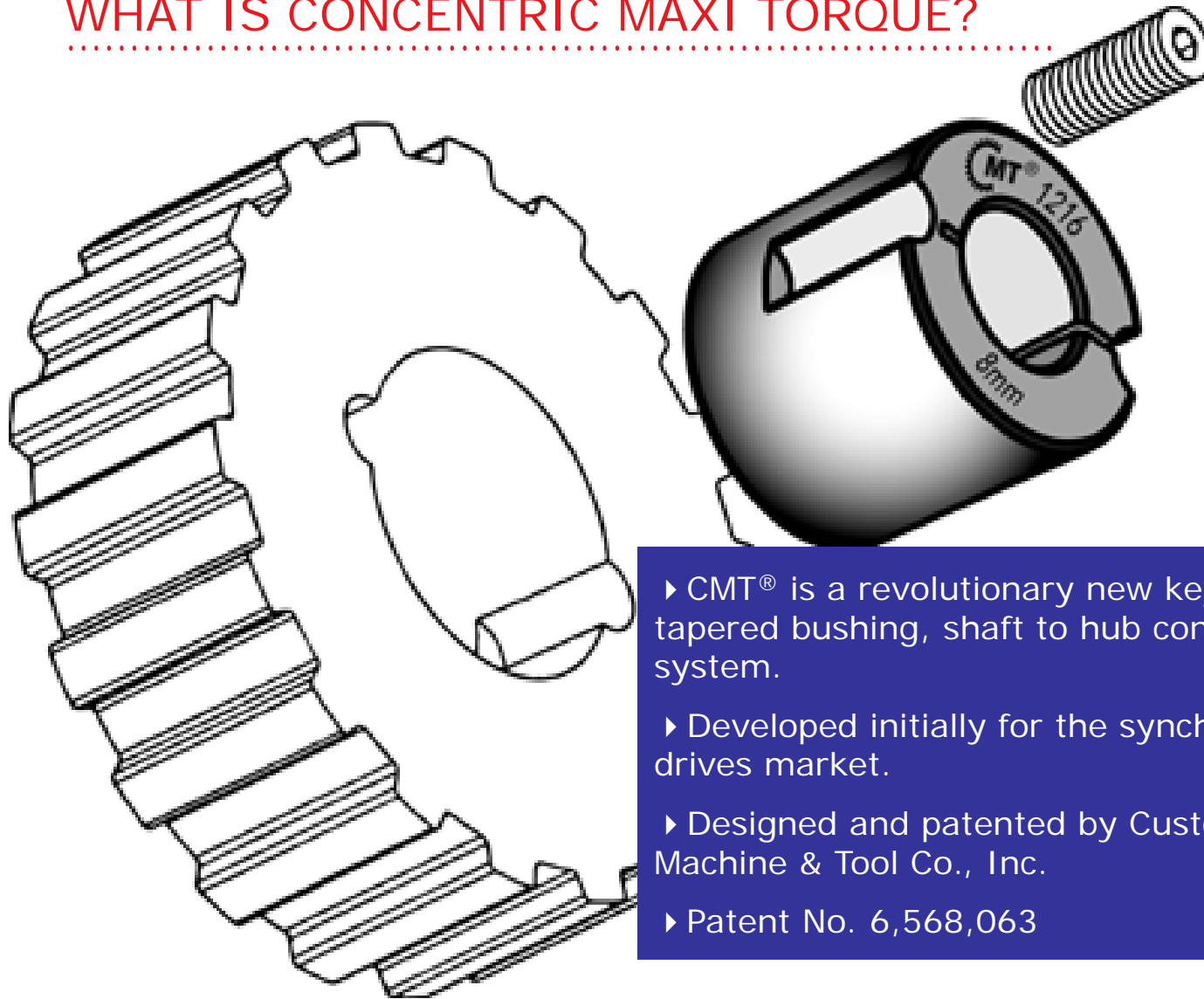


Developed and patented by
Custom Machine & Tool Co., Inc.

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WHAT IS CONCENTRIC MAXI TORQUE?



- ▶ CMT® is a revolutionary new keyless tapered bushing, shaft to hub connection system.
- ▶ Developed initially for the synchronous drives market.
- ▶ Designed and patented by Custom Machine & Tool Co., Inc.
- ▶ Patent No. 6,568,063



WHY CUSTOM MACHINE & TOOL CO., INC. DEVELOPED THE CMT® BUSHING SYSTEM

Custom Machine & Tool Co., Inc, through 40 years of design and application experience in the synchronous drives market, saw a need for a technologically improved hub to shaft connection system.



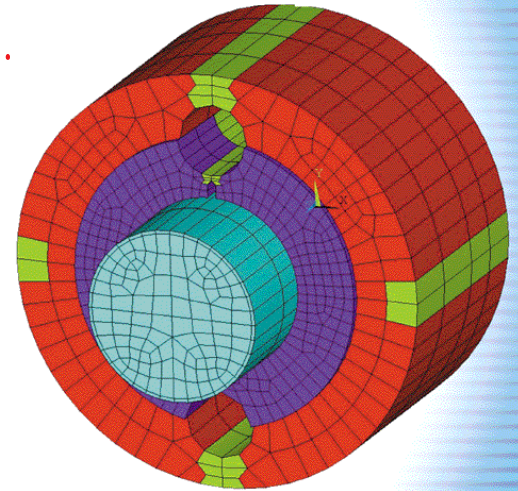
- ▶ As machine speeds and indexing requirements continue to increase reduction in inertia and vibration becomes important.
- ▶ Synchronous timing belts and system components will last longer, go faster and be more accurate when tension excursion is minimized through better run out control.
- ▶ Component alignment and run out are more critical at higher speeds.
- ▶ There was not a high quality compact bushing system available for shaft sizes one inch and smaller.
- ▶ Most connection systems require extra component mass to make the connection.
- ▶ Second and third generation synchronous timing belts are capable of producing higher torques requiring stronger shaft connections.



CMT® TECHNOLOGY

CMT® is a uniquely new bushing attachment system. A single set screw locks the low taper angle split bushing in place and eliminates all of the existing attachment issues.

- ▶ Bushing system is engineered to assure full surface contact and even clamping pressure without cocking with a single set screw.
- ▶ Set screw size optimized to provide holding torque in line with shaft diameters and component torques.
- ▶ Developed using mathematical and FEA modeling.
- ▶ Scalable to any shaft/bore size requirement.
- ▶ Lower inertia and better shaft to component balance.
- ▶ System design assures near perfect hub to shaft concentricity when assembled.



CMT® BUSHING SYSTEM vs. OTHER SHAFT CONNECTION SYSTEMS

Easiest and fastest system to assemble and disassemble

Other Systems	CMT® Bushing System Benefits
Set Screws	Higher torque capacity, lower component run out, better alignment, no shaft distortion
Keyways	No movement under reversing conditions, maintains both axial and rotational position, allows for phase control during assembly, increased shaft contact lower run out
Pins	Higher torque capacity, lower component run out, phase control during assembly, easier assembly and disassembly, reusable
Clamp Collars	Less space required, lower inertia, 360° uniform clamping pressure, lower cost, eliminates component wobble. Multiple bore sizes per component
Other Attachment Systems	Less space required, lower inertia, lower cost, smaller outside diameter for minimum component size with maximum bore



CMT®

PRODUCT FAMILY

Custom Machine & Tool Co., Inc. has developed its CMT® bushing system, through scalable technology, to meet a wide variety of popular, as well as custom, hub to shaft combinations.

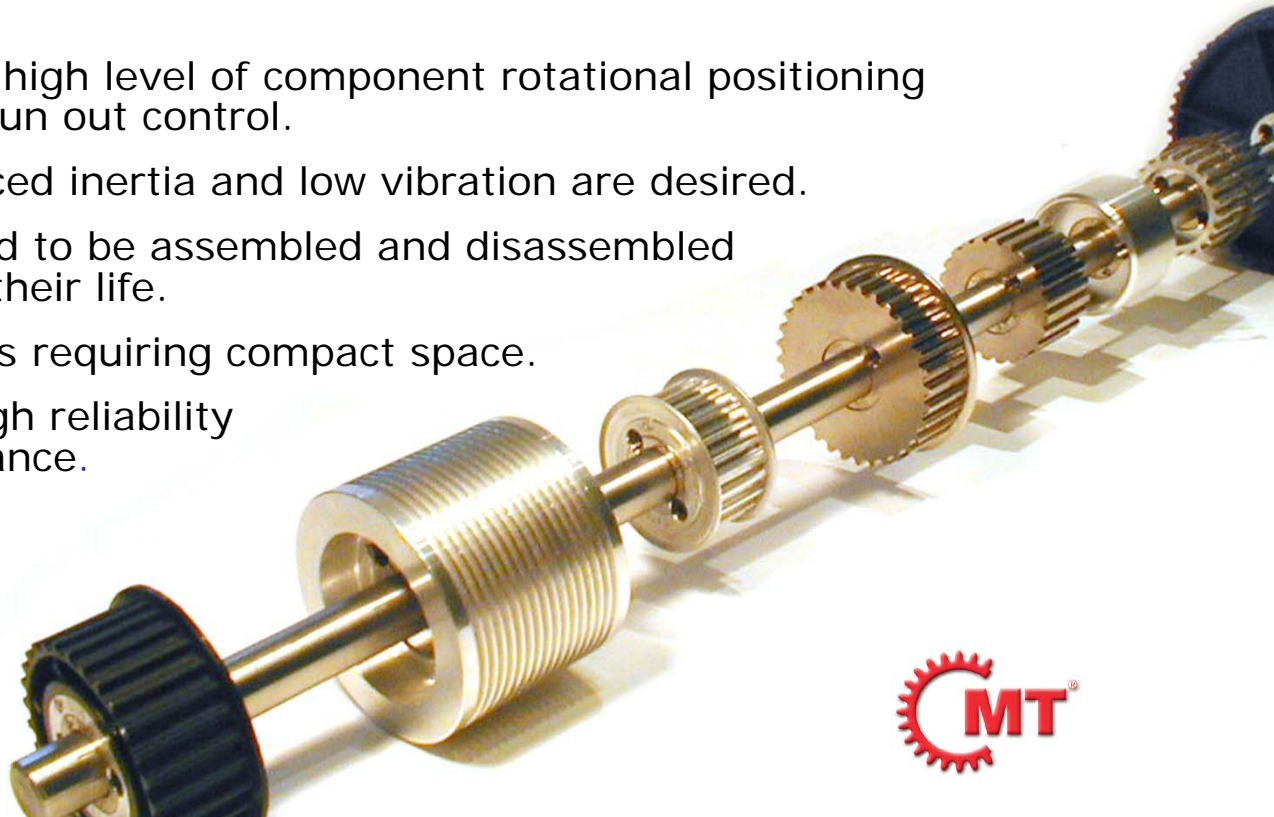
- ▶ Twelve sizes cover bores from .125 in (2mm) to 1.1875 in (30mm)
- ▶ Torque capacities from 14 in-lbs (1.5Nm) to 2,795 in-lbs (315Nm)
- ▶ Multiple bore sizes per bushing size allowing maximum mix and match flexibility with minimum components.
- ▶ Withstands repeated assembly and disassembly with no shaft damage and without a reduction in torque capacity.
- ▶ Flexible positioning accuracy provides easy phase adjustment.



CMT® BUSHING SYSTEM APPLICATIONS

Custom Machine & Tool Co., Inc., an innovative designer and market leader, can apply the CMT® bushing system in solving your most demanding hi-tech synchronous drive and rotating component problems.

- ▶ High speed indexing and reversing in systems using timing belt pulleys and gears.
- ▶ Systems requiring a high level of component rotational positioning accuracy and precise run out control.
- ▶ Designs where reduced inertia and low vibration are desired.
- ▶ Components required to be assembled and disassembled multiple times during their life.
- ▶ Rotating mechanisms requiring compact space.
- ▶ Devices requiring high reliability with minimal maintenance.



CMT® BUSHING SYSTEM PRODUCT OFFERING AND CUSTOM SOLUTIONS

We do it all in small to mid-sized timing pulley applications. Our manufacturing capabilities provide flexibility and low total cost solutions. We are specialists in product customization.

Timing Belt Pulleys	Custom Products
<ul style="list-style-type: none">▶ MXL(.080"), XL(.200"), L(.375"), H(.500")▶ 3M, 5M, 8M, HTD® Profile▶ 2MM, 3MM, 5MM, PGGT® Profile▶ T2, T2.5, T5, T10▶ AT2, AT2.5, AT5, AT10▶ 40DP(.0816")▶ Zero Backlash	<ul style="list-style-type: none">▶ Idler Pulleys▶ Round Belt Pulleys▶ Feed Rollers▶ Spur Gears▶ V-Ribbed Pulleys▶ Sprockets

HTD® and PGGT® are registered trademarks of Gates Corporation



WHERE CAN THE CMT® BUSHING SYSTEM HELP YOU?

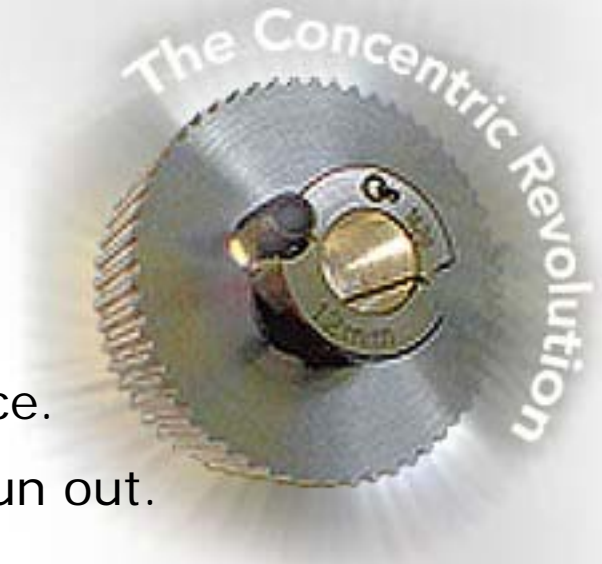
- ▶ Component Alignment and Timing
- ▶ Reversing Problems
- ▶ Inertia and Space
- ▶ Vibration Issues



CONCENTRIC MAXI TORQUE

A Technically Superior Solution

- ▶ Quicker Assembly than other systems.
- ▶ Higher holding reliability-lower maintenance.
- ▶ Improved shaft to hub concentricity-less run out.
- ▶ Multiple bore sizes per bushing size.
- ▶ Reduced inertia for increased power savings.
- ▶ Compact design fits in tighter spaces.
- ▶ Cost competitive with all other attachment systems.



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