



## TORQUE SCREWDRIVERS



// APEX TORQUE LIMITING  
SCREWDRIVERS OFFER HIGH  
QUALITY SOLUTIONS FOR A  
VARIETY OF PRECISION TORQUE  
APPLICATIONS. EACH TORQUE  
SCREWDRIVER IS MADE FROM TOP  
GRADE MATERIALS AND MACHINED  
TO EXACTING TOLERANCES  
RESULTING IN PREMIUM  
PERFORMANCE AND DURABILITY.

# TORQUE LIMITING SCREWDRIVERS

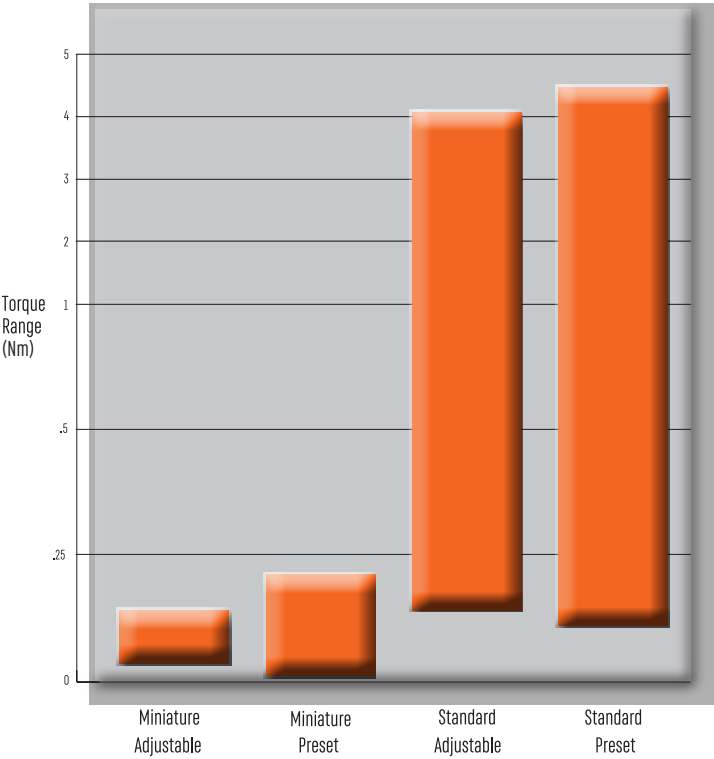
# APEX®

## TORQUE LIMITING SCREWDRIVERS INTRODUCTION:

APEX torque limiting screwdrivers offer high quality solutions for a variety of applications. Our torque screwdrivers add value to the assembly process by enabling you to assess, control and improve product reliability, which ultimately leads to customer satisfaction.

APEX offers a complete line of torque limiting screwdrivers covering a range of 2-640 in. oz. Six standard models are available for light duty torque applications including general electronic and computer assembly. Two miniature models offer reliable fastening of the very smallest of applications such as cellular phone assembly.

Torque Screwdrivers





## QUALITY

Electronics assembly and other light screw assembly applications demand precision that can only be accomplished with the use of precision tools. All APEX torque screwdrivers are made of top grade materials machined to exacting tolerances. Working parts are heat treated for added strength and durability. Then, each tool is carefully assembled by our experienced technicians. All APEX torque screwdrivers feature aluminum housings to reduce weight and maximize durability. Our screwdrivers also feature a unique roller bearing cam, which produces smooth, accurate, and consistent performance when tightening fasteners. When the maximum torque setting is achieved, the cam mechanism automatically slips to prevent over-tightening.

Each APEX screwdriver is calibrated according to ASME B107.14M before leaving the plant, using test equipment traceable to NIST (National Institute of Standards and Technology).



In addition to being highly durable, several features have been engineered into APEX torque screwdrivers to increase ease of use. Each of the three standard adjustable models is distinguished by red, blue and black for easy identification. Also, a patented, spring-loaded locking collar locks the scale at the desired torque setting. This helps to prevent the operator from accidentally using the screwdriver in the unlocked position, which may lead to incorrectly tightened fasteners. All models feature a quick-release bit holder, which securely retains the bit during operation, while allowing for easy removal.

Our manufacturing processes are ISO 9001 certified, which means that APEX products are manufactured to the highest quality standards. Quality materials, precision machining and assembly is what makes APEX torque screwdrivers the tool of choice.

## CALIBRATION INTERVALS

Due to the consistent precision accuracy needed while using these products, we recommend calibrating our torque screwdrivers every six months. However, the quality objectives, frequency of application and type of application will ultimately determine how often to calibrate the tool.



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For more details, please refer to the APEX catalog, SP-301, at  
www.APEX-tools.com/downloads/service-literature

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## UNIVERSAL JOINTS



**// SUPERIOR TORQUE  
TRANSFER SOLUTIONS FOR THE  
TOUGHEST APPLICATIONS -  
IN ZERO GRAVITY, AT 25,000  
FEET OR ON THE FACTORY FLOOR.**



# APEX UNIVERSAL JOINTS OVERVIEW



# APEX®

## LESS DOWNTIME, MORE LIFETIME.

APEX has been supplying universal joints for military and commercial applications since 1933. Over these 80+ years we have provided engineered solutions for thousands of demanding applications worldwide. Today APEX is recognized as the “Less downtime, more Lifetime” leader in pin and cube universal joint designs and applications.

## OUR PRIMARY MARKETS ARE:

### GOVERNMENT/MILITARY APPLICATIONS

APEX meets the demanding requirements military applications such as gun systems, remote valve control, Unmanned Aerial Vehicles (UAV), thrust vector control systems, and fan drive universal joints.



### AEROSPACE

Commercial, military, business jets, and private aircraft all utilize APEX universal joints. Typical uses include flap/ slat actuation, “hinges” for cargo doors and windows, mechanical linkages for steering, trim control and door latching mechanisms. APEX double universal joints have even been used to replace gear boxes. These high strength-to-weight ratio universal joints have excellent torsional freeplay (i.e., backlash) characteristics suited to this environment.



OFF-HIGHWAY/ CONSTRUCTION EQUIPMENT

Applications include steering columns, a variety of mechanical linkages and power take offs. Also included are custom designs for specialty equipment (e.g. fire trucks.)



PERFORMANCE RACING

Our MS series of universal joints have become the standard by which all other universal joints are measured. The same aerospace design considerations are applicable in this competitive market. Primary uses are for steering, shift linkages, and chassis adjustment applications.



INDUSTRIAL POWER TRANSMISSION

This represents the most diverse area of applications. Some typical uses are steel leveling equipment, links to conveyor systems, pump drive systems, multiple spindle drill heads, bowling alley pin setters, canning equipment, centerless grinders, bottling machines, industrial sewing machines, control linkages, mixing equipment, packaging machinery, and industrial scales. This list represents only a fraction of the applications where APEX universal joints are used. Our “quick-change” universal joints are extremely popular in this area. They eliminate precision alignment requirements and allow for quick repair of critical machinery and assembly/conveyor lines.

APEX universal joints consistently deliver performance in process industries where continuous operation is the norm and equipment availability/uptime is critical. Whatever your application, you can depend on APEX universal joints to provide rigidity and exceptionally high strength-to-weight ratios with less deflection, superior fatigue resistance and high overload capacity. Add to this APEX’S wide selection of elastomeric covers that seal lubrication in and protect the universal joint from harsh operating environments (e.g., dirt, water, abrasive slurry, etc.), and you have unsurpassed reliability for your application. All of these features can be incorporated into single, double, telescopic, or quick-change universal joints. We specialize in make-to-order products engineered to optimize your application and reduce operating costs. APEX is the Performance Authority for pin-and-cube universal joints.

# APEX UNIVERSAL JOINTS OVERVIEW

## APEX OFFERS A VARIETY OF SOLUTIONS FOR YOUR STANDARD OR CUSTOM APPLICATION

If your application calls for something other than our standard 300 or 400 series universal joints, APEX can provide it for you. Our engineers are ready to solve your application problems.

Some of the options available are:

### ■ UNIVERSAL JOINT CONFIGURATIONS:

In addition to the standard plain bearing design, there is also a "Press Fit" design which improves fatigue life in reverse loading applications. For higher RPMs, we offer a needle bearing line.

### ■ MATERIALS:

Alloy steels (4140, 4150, 4340), Austenitic stainless steel (303, 304, 316, Nitronic 60), Martensitic stainless steel (416, 440C, 13-8, 17-4, 15-5), carbon steel (1020, 8620) and specialty steels (such as Stressproof and S-2 Modified).

### ■ BEARINGS:

APEX utilizes plain, rolling element and polymer bearings in its designs. Selecting the right bearing maximizes the performance the universal joint, minimizes/eliminates maintenance, and increases the life of the universal joint.

### ■ HEAT TREATMENT:

Advanced heat treat, selective through hardening, induction hardening, and case hardening.

### ■ SURFACE TREATMENT:

Light oil, cadmium (electrolytic and vacuum), electrolytic zinc, nickel (electrolytic and electroless), black oxide, phosphate (manganese and zinc), solid film lubricant, and a variety of paint solutions.

### ■ COVER MATERIALS:

Silicone, Nitrile, EPDM, Viton, Neoprene, FDA approved food polymer, vinyl, Silicon/Dacron, Fluoro-Silicon/Nomex.

### ■ COVER STYLES:

Bulbous, flat, and convoluted.

### ■ LUBRICANTS:

High pressure gear oil, "natural" grease, synthetic grease, synthetic grease with additives (improves "dry start" characteristics), non-outgassing grease, food grade grease, graphite powder, and solid film lubricant.

### ■ GEOMETRY:

Square, Hex, Threaded, splines (involute or straightsided), gears, split collar with lug bolt, keyways, precision diameters (.0002"), gears, whistle-notch, and quickrelease. Where applicable, these are available in male or female.



Additionally, multiple features can be combined on the same hub. APEX engineers utilize these options daily to design the product right for your needs. From extreme loading (including seismic) to harsh environments (-80° to 600° F), APEX is your Total Solution Source.

## QUALITY

APEX universal joints are supplied from our Dayton facility which has AS9100 certification. AS9100 is a widely adopted and standardized quality management system for the aerospace industry and incorporates fully the entirety of the current version of ISO 9001.

Our Dayton facility, manufacturing site of APEX Universal Joints, has AS9100 Quality System Certification. The driving force behind the implementation of the Quality System is the commitment "to provide our customers with the best value delivered by offering only products and services that meet or exceed their expectations."



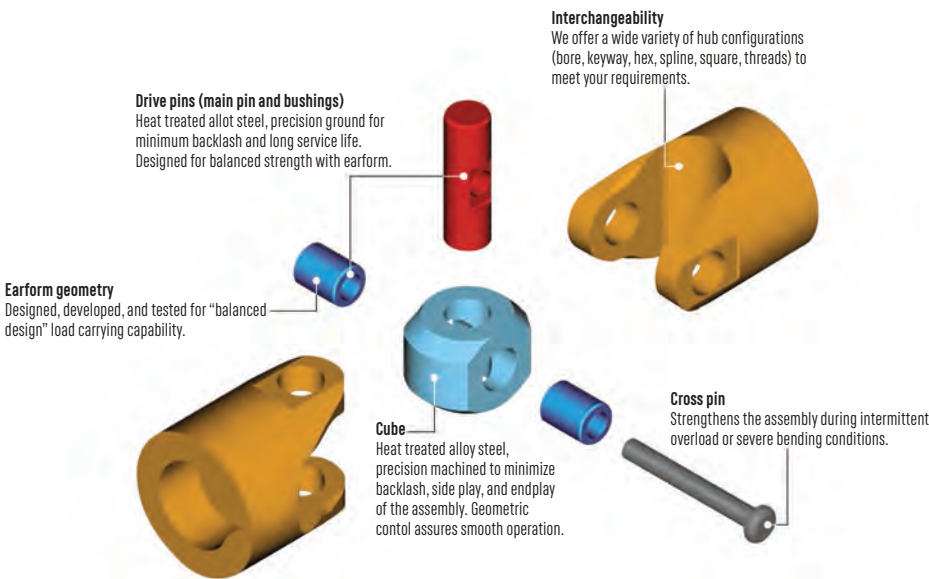


THE APEX TOTAL SOLUTION DESIGNED INTO EVERY UNIVERSAL JOINT

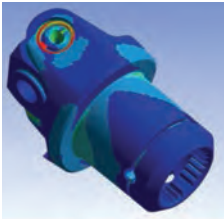
The illustration below highlights many of the common design features that have made Apex the Market Leader in providing “less downtime, more lifetime” for some of the most demanding applications. At the heart of this success is engineering excellence that created and continues to refine this design to meet the ever increasing challenges of new applications. To further compliment this, add Apex’s manufacturing capabilities and its proprietary heat-treat processes. The result is a “balanced” design that provides the highest strength-to-weight ratio pin and cube universal joint available. It is not uncommon for Apex to outperform the competition by at least 30% in strength for equivalent size products.

PERFORMANCE  
FEATURES:

- Efficient operation up to 35° standard (higher operating angles available)
- Designed-in overload capacity for greater reliability. (Temporary torsional overloads up to 80% and axial overloads up to 150% of the rated ultimate capacity can occur without harmful binding.)
- Advanced heat treat of alloy steel maximizes “toughness”
- Available with covers that seal in lubrication and greatly improve service life.



APEX design engineers utilize 3-D solid models and finite element analysis (FEA) to develop and evaluate different design options.



When you bring your applications to APEX, you will be supported by a technical staff that has decades of experience in performing Finite Element Analysis (FEA), 3-D Solid Modeling, Metallurgical analysis, non-destructive testing, functional testing, and prototype production.

For further information please contact us at 1-800-845-5629 or visit us at [www.APEX-tools.com/tools/universal-joints](http://www.APEX-tools.com/tools/universal-joints)



BECAUSE THERE'S A LOT ON THE LINE.™

APEX®

ASSEMBLY & FABRICATION TOOLS

DAYTON, USA  SINCE 1933

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