Established in 1985, Koenig Engineering Inc. (KEI) supplies proven World Class Quality Turning Gear drive designs for the rotating equipment industry. Over 1000 Turning Gears for gas and steam turbines, compressors and industrial fan applications are in the field, with outputs from 500 ft-lbs to 150,000 ft-lbs, at speeds from fractional to 200 RPM. The majority of these designs are custom engineered. Koenig uses only durable components, and sizes them to maximize their service life. All Turning Gears are backed by Koenig’s superior customer support and service.

New and Retrofit Applications
KEI will design a Turning Gear to accompany any new industrial installation, to provide maximum protection from rotor damage. In addition, KEI will custom engineer Turning Gears for any existing application to meet the customer’s torque and speed requirements, as well as existing interfaces and electrical specifications.

KEI Turning Gear Features and Options:
• Electric Motors: 50 or 60 Hz AC, DC, IEC with CE Mark, CSA or NEMA designs available, customized to meet any specification, including ATEX and UL certification.
• SSS Clutch: Fully automatic engage and disengage operation. No Pneumatic or Hydraulic controls required.
• Low continuous lube oil requirements for clutch: 1.0-2.5 gpm at available pressure.
• Clutch Options: Proximity Probes to indicate position (engaged/disengaged). Manual or Electric lockout feature. Increased axial growth capability designs available.
• Worm Gear Reducer: Single or Double reduction, offers high gear ratio in small space, quiet and smooth operation, self contained oil reservoir, long life, resilience against high shock loads.
• Custom Engineered housing, shaft and foundation interfaces.
• Unlimited range of Breakaway Torque and Output Speeds.
• Guarded Manual Turning Adapter: Standard hex or square shaft extension on motor or primary worm, used for incremental rotor positioning for alignment and boroscope operation or in the event of power outage.
• Soft-Start: KEI Turning Gears for high speed / high inertia applications are available with built-in soft-start capability.
• Grounding Brush System Options: Insulated or Non-Insulated.
• Reverse Rotation / Overload Protection Option: For Turning Gears mounted where reverse rotation is possible, this package protects the Turning Gear from damage.
• Designs are Engineered for manufacturability using a modularized approach, facilitating ease of installation, operation, maintenance, and removal.
• Documentation: Complete drawing and documentation package, including Instruction Manuals.

KEI Turning Gear for General Electric 7FH2 Generator fitted with AC motor and DC motor backup drive.

KEI Turning Gear mounted on Mechanical Drive Steam Turbine Low Pressure Bearing Bracket.
Turning Gear Common Design Features:

Worm Gear Reducers

All Koenig Engineering Turning Gears utilize a single or double reduction Worm Gear reducer in place of helical gears, which gives several advantages. Worm gearing allows a large speed reduction in minimal space, typically reducing the envelope requirement of the Turning Gear. Worm gearing is extremely smooth and quiet, and resilient in response to the high shock loads that occur at Turning Gear startup. High strength and durability ratings maximize component life.

SSS Overrunning Clutch

In the heart of KEI’s Turning Gears lies an SSS (synchro-self-shifting) automatic overrunning clutch. These clutches are fully automatic, and will engage and disengage based simply on the relative speed of the input and output components. No hydraulics, pneumatics, or actuators are required. SSS clutches transmit torque through finely machined gear teeth, providing high torque capacity in a small package. The engaging pawls lift off centrifugally when the driven equipment accelerates. This is in contrast to traditional sprag clutches, which are configured such that the sprags ride directly on the race at all times, leading to shorter service life.

Since the clutch automatically engages and disengages, roll-on/roll-off phenomena, experienced at times on clash gear style Turning Gears, is not a concern.

Long Service Life with Low Maintenance

Koenig uses only durable components, and sizes them to maximize their service life. High strength and durability ratings allow for across-the-line start up, eliminating the expense of soft-start controls. Worm Gears and SSS clutches supplied have proven track records. For our Worm Gear we recommend Mobil SHC Synthetic lubricants, which do not need replacement nearly as often as conventional oils, while providing superior lubrication to the gearing and bearings in extreme temperatures. The clutch is continuously fed with oil from the main plant lubrication system - requirements are typically only 1 - 2.5 gpm.

Koenig Service and Support

Koenig Engineering takes pride in its customer service and support. Engineers are available during business hours for any questions and concerns regarding installation, maintenance or repairs. Our spare parts department can help expedite repairs, minimizing any downtime.

Data Required for Complete Sizing Analysis:

- Sketch of train layout with components identified
- Rotor weight for each component
- Bearing diameter for each component
- Bearing Type (sleeve, elliptical, 5 pad Load Between Pad etc.)
- Rotor Inertia for each component
- Load gear reduction or step-up ratio
- Flexible coupling axial load(s) and location(s)
- Flexible coupling load direction (pre-stretch or pre-compress)
- Thrust bearing O.D.’s and locations
- Axial endplay to be accommodated

Data Required to Complete Project Details:

- Motor Electric specification(s)
- Hazardous Area Classification
- Overrunning speed of shaft Turning Gear is driving
- Housing interface details
- Shaft interface details
- Foundation interface details (if applicable)
- Optional Features desired (if applicable)
- Direction of Rotation
- Applicable customer specifications
AC COMPRESSOR
ASEA BROWN BOVERI INDUSTRIAL SYSTEMS
BHARAT HEAVY ELECTRICALS LIMITED
BRUSH ELECTRICAL MACHINES, LTD.
BYRON JACKSON PUMP DIVISION - BORG WARNER CORP.
COMMONWEALTH EDISON
CONMEC, INC.
DRESSER RAND S.A.
DRESSER RAND STEAM TURBINE, MOTOR & GENERATOR DIVISION
EBARA CORPORATION
ELECTRIC MACHINERY
ELIN ENERGIEVERSORGUNG LTD.
ELLIOTT COMPANY
GENERAL ELECTRIC COMPANY - ELECTRIC MOTOR DIVISION
GENERAL ELECTRIC COMPANY - GAS TURBINE POWER SYSTEMS DIVISION
GENERAL ELECTRIC COMPANY - NAVAL & DRIVE TURBINE SYSTEMS
HOWDEN BUFFALO, INC.
INTERNATIONAL MINERALS & CHEMICAL CORP.
KJC OPERATING COMPANY
LUFKIN INDUSTRIES, INC.
NUOVO PIGNONE
PETRO CANADA, INC.
PHILADELPHIA GEAR CORP.
SCOTT PAPER COMPANY
SIEMENS DEMAG DELAVAL TURBINE DIVISION
SIEMENS-WESTINGHOUSE CANADA, INC.
SIEMENS-WESTINGHOUSE POWER CORPORATION
SIEMENS-WESTINGHOUSE POWER GENERATION DIVISION
SSS CLUTCH COMPANY
UNITED STATES AIR FORCE
U.S. TURBINE CORPORATION
VULCAN CHEMICALS
WESTINGHOUSE CANADA, INC.
WESTINGHOUSE POWER GENERATION DIVISION
KEI Provided Starting/Turning Gear Package Fitted With DC Emergency Drive For World's Largest Mechanical Gas Turbine Drive System. (1992)
CUSTOMER: Nuovo Pignone Frame MS7001E
PROJECT: Shell Malaysia LNG Plant

KEI Supplied Turning Gear Module for World's Largest Mechanical Steam Turbine Drive Arrangement. (1991)
CUSTOMER: General Electric Naval & Drive Turbine Systems
PROJECT: Dow Chemical Plaquemine, LA

KEI Turning Gear Design Selected For General Electric Frame MS7001FA and MS9001FA Gas Turbine Generators Utilizing Static Inverter Starting Means. To Date Over 500 Turning Gears For This Application Have Been Supplied With A Cost Reduced Design In Place.

KEI Turning Gear Design Selected For LM6000 Geared Gas Turbine Generator Drives.
CUSTOMER: Lufkin Industries / Stewart & Stevenson
PROJECT: LM6000 50HZ Production Units

CUSTOMER: U.S. Air Force / Calspan
PROJECT: Arnold AFB / AEDC

KEI Designed And Supplied First Domestic W501F Starting/Turning System.
CUSTOMER: Westinghouse Power Generation Division
PROJECT: Florida Power & Light, Ft. Lauderdale


First Commercial Compressed Air Energy Storage Plant Built In USA Specified KEI Turning Gear Systems.
CUSTOMER: Dresser Rand Steam Turbine, Motor & Generator Division
PROJECT: CAES 110 MW Alabama Energy Co-Op
KEI Chosen To Supply General Electric With A Modularized Starting/Turning System With Emergency DC Drive Option For MS9001E Production Gas Turbines Utilizing A3 Generator Design.

Westinghouse Electric Corporation Selected KEI To Design And Supply W701D Gas Turbine Starting/Turning Package.
PROJECT: CAPEX III, Argentina

KEI Provided Turning Gear for GE MS9001FA Single Shaft Combined-Cycle Configuration.
PROJECT: Black Point Power Plant, Hong Kong, CAPCO

KEI Selected To Retrofit Existing Early GE Frame MS7001B Gas Turbines With Turning Gear And Automatic Starting Disconnect Feature.
CUSTOMER: General Electric Power Systems
PROJECT: Houston Power & Light, T.H. Wharton Generating Station, TX

KEI Provided Turning Gear Arrangement For World's Largest Gas Turbine Generator. (1992)
CUSTOMER: General Electric / John Brown Frame MS9001FA
PROJECT: Scottish Hydro KBE & Medway, UK

KEI Has Designed And Supplied One Hundred (100) W501D5 Gas Turbine Starting Packages For Westinghouse Electric Corporation (Siemens-Westinghouse Power Corp.) Since 1985.


Siemens-Westinghouse Power Corporation Selected KEI To Design And Supply Two Speed Turning Gear For W501G And W501F Gas Turbine Generator Utilizing Static Inverter Starter Means.

Zion Nuclear Facility (Commonwealth Edison) Installed Two (2) KEI Turning Gear / Disconnect Modules Rated For 150,000 lbs-ft BAT On 1000 MW Generators Retrofitted For Synchronous Condensing Duty.