

## Descriptions

A **Bevel Gear Ball Screw Jack** is a type of screw jack that incorporates a ground spiral bevel gear set with a ball screw lift shaft to convert rotary motion into linear motion. This design combines the benefits of both bevel gears and ball screws, resulting in a high-performance lifting and positioning solution. Load capacities include **1 ton, 3 ton, 5 ton, 10 ton, 15 ton and 20 ton.**

### Design and Components:

- **Bevel Gear Set:** Ground spiral bevel gears, hardened and sharpened, are used for power transmission within the jack's housing.
- **Ball Screw Lift Shaft:** A ball screw is paired with a nut and circulating ball bearings, which greatly reduces friction and allows for smooth, efficient movement.
- **Housing:** The housing is typically made from robust material like nodular cast iron.

### Key Features and Advantages:

- **High Efficiency:** The combination of bevel gears and a ball screw significantly increases efficiency compared to worm gear jacks. This allows for faster travel speeds and higher duty cycles, even near continuous operation.
- **High Load Capacity:** Bevel gear ball screw jacks can handle substantial loads.
- **Low Input Torque:** Due to the high efficiency, less input torque is required to move the load compared to machine screw jacks.
- **Drive Shaft Flexibility:** They are available in one, two, or three shaft configurations, making them ideal for multi-jack systems and potentially eliminating the need for separate right-angle gearboxes.
- **Accurate and Repeatable Positioning:** Bevel gear ball screw jacks provide good positional accuracy and repeatability, especially in high-speed applications.

### Considerations:

- **Not Self-locking:** Bevel gear ball screw jacks, unlike some machine screw jacks, are not inherently self-locking. This means they will require a brake or motor with sufficient holding torque to prevent back-driving and hold the load in position.
- **Cost:** While offering advantages in efficiency and flexibility, bevel gear ball screw jacks may be priced slightly higher than worm gear or machine screw jacks due to their increased complexity and components.

### Applications:

Bevel gear ball screw jacks are suitable for a wide range of applications that require high speed, accuracy, and frequent operation, such as: Lifting and positioning platforms, loading tables, or carriages, Adjusting the height of conveyors or rollers, Positioning saw blades or vibratory cutters, Operating stage lifting systems, Automated assembly lines, Replacing hydraulic systems in various applications.

## Materials

We use the best materials to guarantee the performance and lifetime of the bevel gear ball screw jacks you purchased.

### Spiral Bevel Gears

- Lapped together in pairs, high quality alloy steel, case hardened.

### Ball Screw

- SCM 450, S55C, Hardness: HRC 58-62.

### Ball Nut

- SCM415H, Hardness: HRC 58-62.

### Ball

- SUJ2, Hardness: HRC 60 UP.

### Input Shaft (Worm)

- Hardened, alloy steel. Custom Stainless Steel 304 or 316.

### Housing

- High-strength Casting Housing, Ductile Iron.

### Drive Sleeve

- High Strength Bronze ZQA19-4 (Casting aluminum bronze) as Standard, Custom High Strength Bronze ZCuSn10PbI(Casting tin bronze)

### Bearing

- Anti-friction Tapered Roller Bearings. Custom Stainless Steel 304.





Selection Guide

Selection Notes

- (01) Bevel Gear Screw Jacks and Lifting Systems are for industrial use only, not recommended for transporting personnel.
  - (02) Carefully consider bevel gear jack ratings before making a selection. Be sure that the dynamic or static load carried or sustained by jack does not exceed its maximum capacity.
  - (03) Carefully consider the combination of screw shaft speed (rpm) and rated load. Also, take extra care in verifying rated buckling load and screw shaft speed (rpm). Exceeding the data provided in this catalog can cause major damage to the system.
  - (04) Make sure that the surface temperature of the housing does not exceed temperature of -15°C to +80°C during operation. If using a traveling nut jack, measure the traveling nut surface temperature. Make sure all the rotating parts are completely stopped before proceeding to measure.
  - (05) The maximum input speed is 1500 rpm as long as the input power does not exceed the jack's maximum allowable input power.
  - (06) Bevel Gear Jack can not be operated continuously. Duty cycle based on 30 minutes.
    - **Note:** Below duty cycles are based on ambient temperatures 20°C. For ambient temperatures higher than 20 °C, the duty cycle (ED) must be reduced.
      - \* Screw Jack with Trapezoidal Screw (Bevel Gear Machine Screw Jack) duty cycle ≤ 35%ED.
      - \* Screw Jack with Ball Screw (Bevel Gear Ball Screw Jack) duty cycle ≤ 60%ED.
    - **Note:** For operation longer than that mentioned above or for any continuous operation, the jacks temperature must be monitored and should not exceed 80°C maximum in order to determine its duty cycle.
- Duty Cycle (%ED) = [1 Duty Cycle / (1 Duty Cycle + 1 Rest Cycle)] x 100%**
- (07) Be sure not to exceed the maximum input torque for multiple screw jack systems by verifying the rated input torque for each jack.
  - (08) Be sure that starting torque is 200% or more of required running torque.
  - (09) Be sure that ample driving power is available to drive the jack when using in temperatures below 0°C. Low temperatures decrease the jack's efficiency due to the increased grease viscosity inside the jack's gearbox.

Selection Guide

- (10) Although Screw Jack with **Single-start** Trapezoidal Screw (Bevel Gear Machine Screw Jack) has self-locking feature, vibration and shock may affect its efficiency, in which case a brake motor or extra braking device is required. Screw Jack with **Double-start** Trapezoidal Screw (Bevel Gear Machine Screw Jack) is considered not self-locking will require a brake or other holding device. Screw Jack with Ball Screw (Bevel Gear Ball Screw Jack) can backdrive because of their extremely high efficiencies and require some means of holding the load, such as a brake motor.
- (11) When jacks are working, can not force to stop, may result in the jacks damage or injury personnel.
- (12) When Bevel Gear Ball Screw Jack are under loads, can not change the motor drive to manual operation. Because the loads will cause the input shaft to rotate very dangerously.
- (13) Mechanical stops (Stop Nuts) are not provided on the lifting screw unless requested. Therefore, it is possible to drive the screw out of the jack's housing
- (14) Never approach or touch the rotary parts (input shaft, etc.) or the lifting screw during operation.
- (15) Bellows Boots and Protective Tubes should be used to protect and keep the lifting screw clean in dusty or abrasive environments.

Unit Converter

- 1 ft = 304.8 mm
- 1 in = 25.4 mm
- 1 m = 10 dm = 100 cm = 1000 mm
- 1 in-lb = 0.113 Nm
- 1 Nm = 0.737 ft-lb
- 1 ft-lb = 1.356 Nm
- 1 lb = 0.454 kg
- 1 kg = 2.205 lb = 1000 g
- 1 N = 0.1 kg
- 1 t = 1000 kg = 10 kN = 2000 lb
- 1 m/min = 1000 mm/min = 16.7 mm/sec
- 1 in/sec = 25.4 mm/sec
- 1 ft/sec = 304.8 mm/sec
- 1 hp = 0.75 kW
- °C = (°F-32) / 1.8
- °F = °C x 1.8 + 32



**Selection Guide**

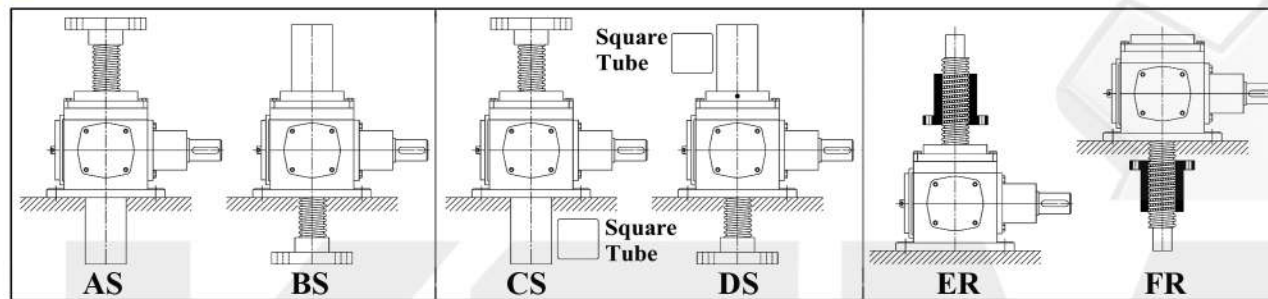
**Sample Part Number ( Example ):**

**KMF1T2.5AS600TP2SRZB**

**(1) Models and Gear Ratios**

KMF1T ( BS 20x5 / BS 20x10 ) <b>2.5:1 ratio</b>	KMF3T ( BS 32x10 / 32x20 ) <b>2.5 : 1 ratio</b>	KMF5T ( BS 40x10 / 40x20 ) <b>3: 1 ratio</b>
KMF10T ( BS 50x10 / 50x20 ) <b>3: 1 ratio</b>	KMF15T ( BS 63x10 / 63x20 ) <b>3: 1 ratio</b>	KMF20T ( BS 80x10 / 80x20 ) <b>3: 1 ratio</b>

**(2) Basic Designs and Configurations**



**2.1) "AS" and "BS" are Bevel Gear Machine Screw Jacks.** A translating jack has a lifting screw that moves through the gearbox. A nut is integrated with the bevel gear such that the bevel gear and nut rotate together. When the lifting screw is held to prevent rotation through the use of guides (guided load) or by attaching a common load across multiple jacks, the lifting screw will move linearly through the gearbox to move the load. Most applications use this jack design

**2.2) "CS" and "DS" are Anti-rotation Bevel Gear Machine Screw Jacks.**

An anti-rotation jack is attached Square Guide Tube for non-rotation. A square guide tube is attached to either the top or bottom of the Screw Jack. A square nut is attached to the end of the Lifting Screw which is then fitted inside the tube, preventing rotation. The Square Guide Tube is supplied with lube fittings. It is ideal for use in applications where a single jack must extend to meet and move a load to which it is not attached (unguided).

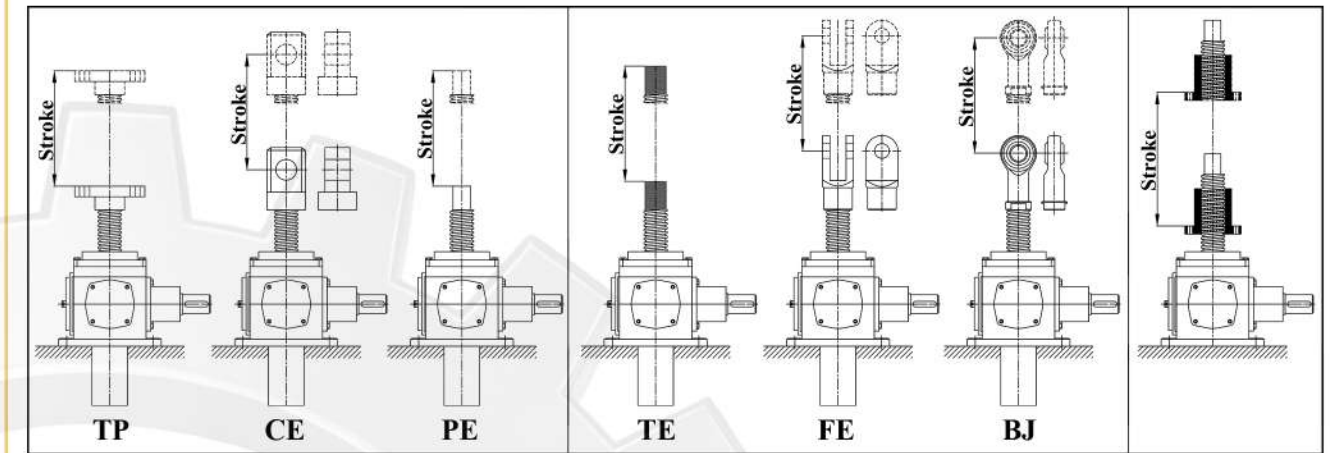
The anti-rotating jacks are mostly used on larger jacks and where the lifting force is high in relationship to the nominal capacity or where the travel is long.

• **Note:** Input torque required will increase by approximately 8%.

**2.3) "ER" and "FR" are Bevel Gear Machine Screw Jacks.** A rotating jack has a lifting screw that moves a nut as it turns. It is important to restrain the rotation of the traveling nut by Applying a significant load, or more commonly by guiding the load or attaching the load across multiple jacks. The lifting screw is fixed to the bevel gear. This causes the load, which is attached to the travel nut, to move along the lifting screw. The Rotating Jacks mount flush and they are ideal for applications where the physical space does not allow the lifting screw to extend below or above the housing.

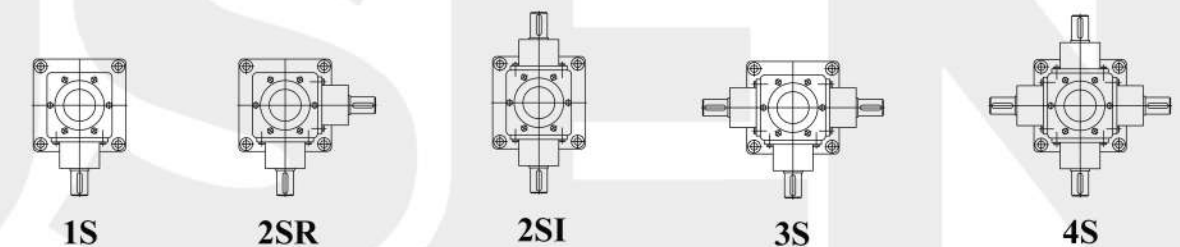
**Selection Guide**

**(3) Stroke and Screw End Fittings**

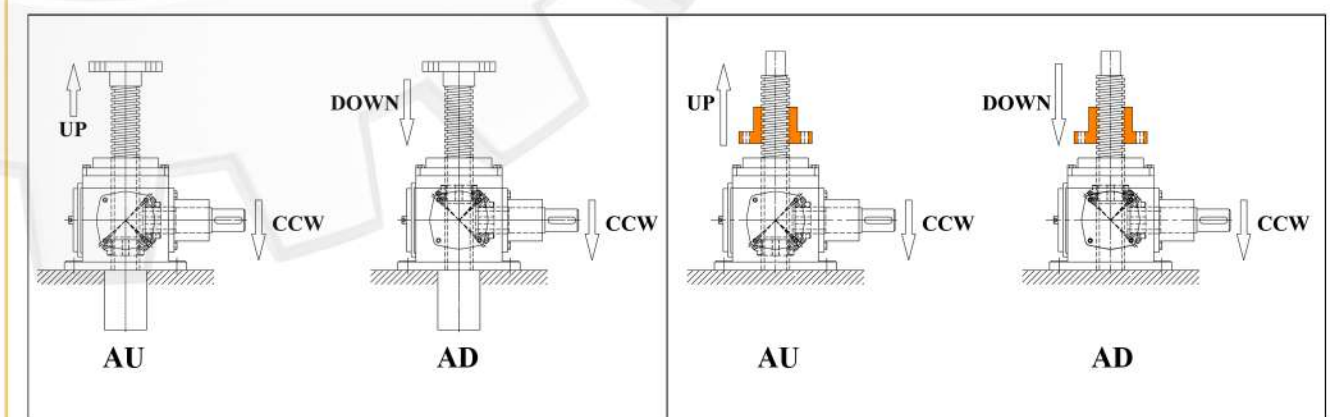


- Stroke is travel expressed in millimeter(mm) or inches and not the actual screw length.
- Standard Lifting Screw End Fittings: (TP)Top Plate , (CE)Clevis End , (PE)Plain End , (TE)Threaded End , (FE)Forked End and (BJ)Rod End . Custom End Fittings are acceptable.

**(4) Input Shafts Codes and Motor Flange Adapters Codes (Top View)**



**(5) Gears Mounting Postions**



**Selection Guide**

**Sample Part Number**

**(6) Accessories**

 <b>C</b> Flex Coupling	 <b>U</b> Universal Joint	 <b>T</b> Telescopic Universal Joint	 <b>L</b> Connecting Shaft	 <b>BJ</b> Rod End	 <b>FE</b> Fork End
 <b>PB</b> Pillow Blocks	 <b>FB</b> Flange Blocks	 <b>Z</b> Protective Tube	 <b>B</b> Bellows Boots	 <b>SN</b> Stop Nut	
 <b>MF</b> Motor Flange	 <b>SP</b> Trunnion Mount Plate	 <b>SF</b> Safety Nut	 <b>DZ</b> Double Clevis Protective Tube	 <b>FZ</b> Square Protective Tube	
 <b>M</b> Electric Motor	 <b>R</b> Geared Motor	 <b>K</b> Bevel Geared Motor	 <b>RV</b> Worm Gearbox	 <b>DC</b> DC Motor	
 <b>SM1</b> Stepper Motor	 <b>SM2</b> Servo Motor	 <b>CH</b> Hand Wheel	 <b>EN</b> Rotary Encoder	 <b>P</b> Proximity Switch	

**Specifications**

**Remarks:**

- 1) Overall efficiency is under grease lubrication.
- 2) Not self-locking, brake motor is required.
- 3) They maximum dynamic load is under Euler II(fully guided).

Model	KMF1T	KMF3T	KMF5T	KMF10T	KMF15T	KMF20T
Maximum static load capacity (kgf)	1000	3000	5000	10000	15000	20000
Maximum dynamic load capacity (kgf)	300	1000	1500	2500	3500	5000
Ball screw sizes (mm)	20 x 5 20 x 10	32 x 10 32 x 20	40 x 10 40 x 20	50 x 10 50 x 20	63 x 10 63 x 20	80 x 10 80 x 20
Gear ratio	2.5:1	2.5:1	3:1	3:1	3:1	3:1
One Turn of Input Shaft, Travel (mm)	2 4	4 8	3.33 6.67	3.33 6.67	3.33 6.67	3.33 6.67
Overall Efficiency %	60%					
Ball Nut Material	Gcr15					
Housing material	Ductile Iron					

## Screw Jack System Configurations

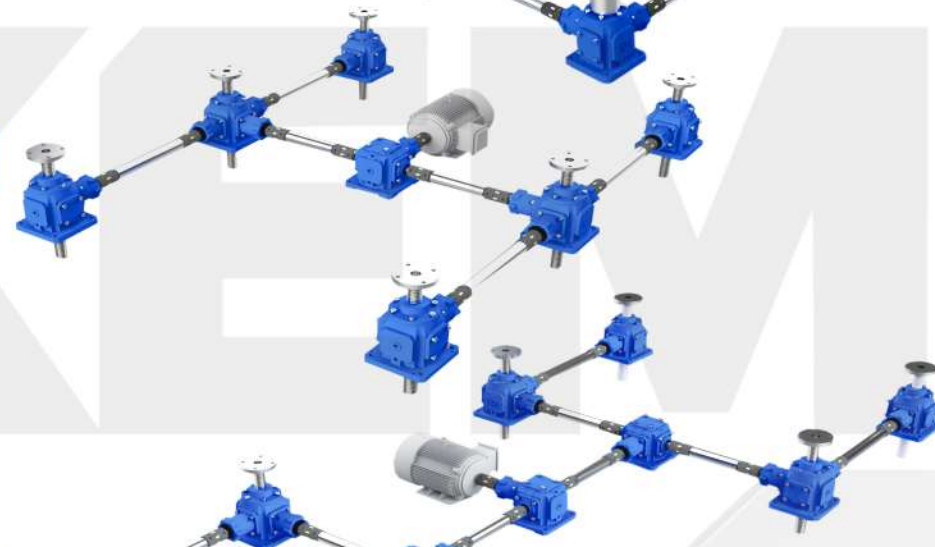
### Two Jacks



### Four Jacks



### Six Jacks



### Eight Jacks

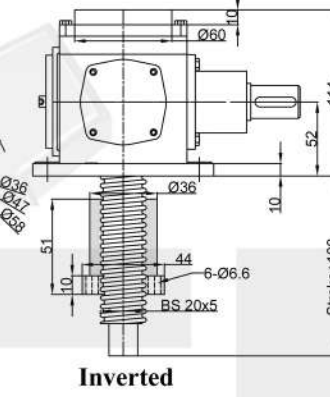
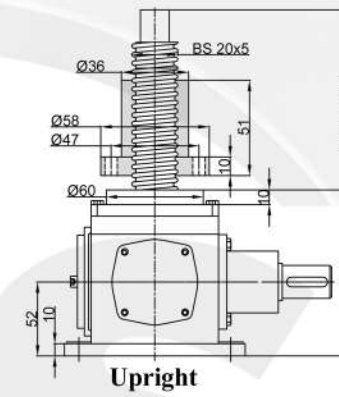
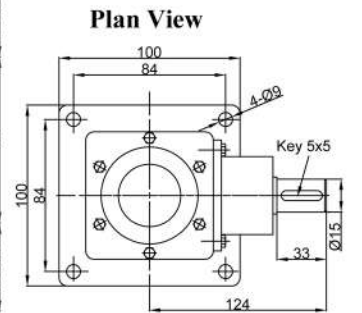
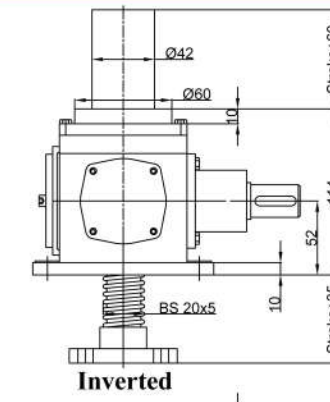
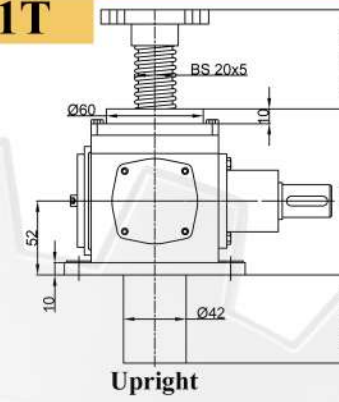


### Fourteen Jacks

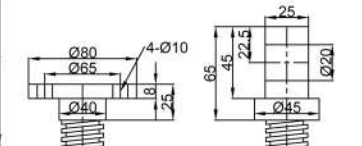


## Overall Dimensions

### KMF1T



### Screw End Types and Dimensions

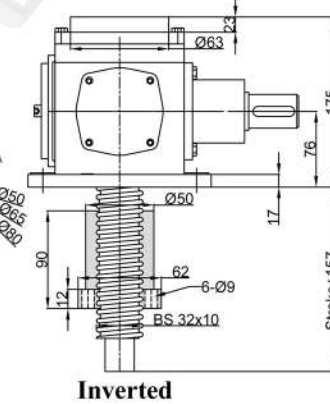
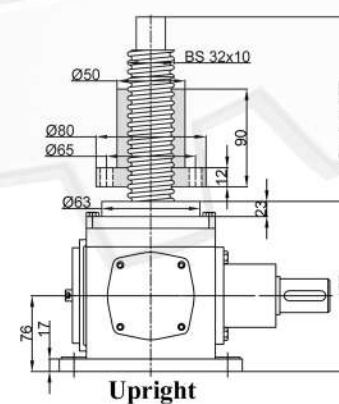
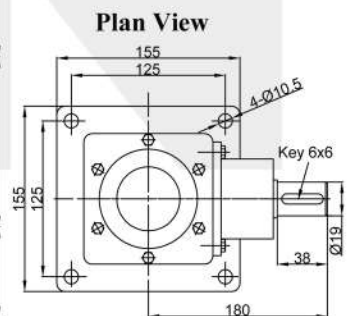
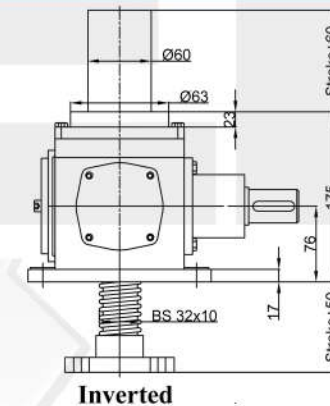
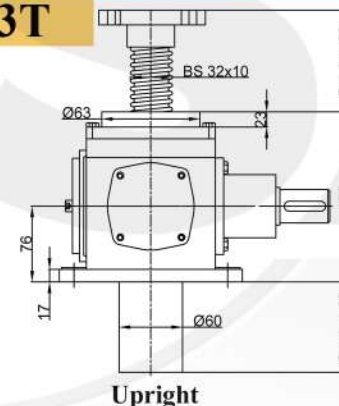


### I Top Plate II Clevis End

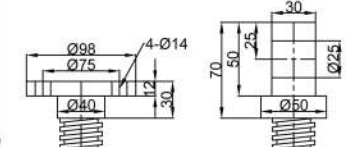


### III Plain End IV Thread End

### KMF3T



### Screw End Types and Dimensions



### I Top Plate II Clevis End



### III Plain End IV Thread End

\*. Dimensions are subject to change without notice

