Flanged Universal Joints
What is a Universal Joint?

- Transmits Power from Driving to Driven Equipment
- Accommodates High Angular Misalignment
  - Up to 35 Degrees
- Low Maintenance - Requires Little Grease
- Easily Repaired
Where are Universal Joints Used?

- Used Extensively in Major Markets Currently Served by Kop-Flex/EPT
  - Steel, Pulp & Paper, Mining, Machinery & Oil/Petrochemical

- Industry Shift from Gear Type to Universal Joints
  - Growth due to Switch from High to Low Maintenance Product
  - Universal Joint Offers Greater Misalignment Capacity (up to 35 Degrees) Compared to Gear Type Spindles
  - Quick Service is Required to Serve the Industry Needs
Applications

- Steel & Aluminum Mills
  - Bridles, Casters, Levelers, Pinch Rolls, Rolling Mills (Bar, Rod, Section, Structural, Wire, Hot Strip & Cold Strip), Straighteners, Tension Reel

- Pulp & Paper Mills
  - Barkers, Calenders, Couch/Press/Suction Rolls, Dryers, Process Pumps, Sizing Rolls

- General Industry
  - Conveyors, Crushers, Marine Propulsion Drives

- Pump Applications
  - Sewage, Water Treatment, Process Pumps
Bar Mill Universal Joint Applications
Plate Mill Universal Joint Applications

Diagram of steel plate mill processes. Components include:
1. A lever is commonly used to improve the finish of the plate. The schematic drawing below shows a process in which the plate is cut, shaped, and formed into the final product, which represents the steel overall.

2. Drawing through the pipe to give it additional strength and improve its characteristics requires a precise process. Each step is critical in ensuring the quality of the final product.

3. Cold expansion and hydrostatic testing: These steps are crucial to ensure the pipe or component meets the required standards for use.
Cold and Hot Rolling Mill Universal Joint Applications

hot- & cold-rolled sheet mill products

In a few minutes the continuous hot rolling machine shown above, cold in the rough and annealed (annealing is a process in which steel is heated and cooled slowly to remove stresses) hot-rolled steel mill, turns out steel in the form of slabs in a wide variety of shapes and sizes. These slabs are then run through a series of cold rolling mills which make the steel thinner. Cold rolled steel is then used to produce a wide range of products, including automotive parts, appliances, and construction materials. The final products are then cut to size and sent to customers for use in a variety of applications.
Types of Universal Joints

Figure 1 Split Yoke

Figure 2 KOYO Block Design

Figure 3 Solid (Closed) Eye

Figure 4 Split Eye
Theory of Operation

• Single Joints
  - Output speed fluctuates as a function of input speed & angle
  - The result is a whipping effect for the output shaft
  - Acceleration & deceleration of the output as it rotates through 360 degrees
  - Non-uniform transmission of angular velocity (rpm) through a single joint
**Theory of Operation**

- Double Joints (universal driveshafts)
  - Two joints are used to cancel out the angular acceleration caused by a single joint
  - The two joints must be:
    - installed in phase end to end on the driveshaft
    - operating at equal angles
  - If not, driven equipment will see non-uniform angular velocity.
Industrial Universal Joint Series

- Light Series
- Medium Series
- Heavy Duty Series
- Extra Heavy Duty Series
- Flanged
- MAXXUS
## Type & Size Configuration

<table>
<thead>
<tr>
<th>Name</th>
<th>Picture</th>
<th># of Sizes</th>
<th>Swing Sizes</th>
<th># of Flange Variations</th>
<th>Flange Sizes</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Light Duty Type</strong></td>
<td><img src="image" alt="Light Duty Type" /></td>
<td>14</td>
<td>58-265 mm</td>
<td>Din Standard &lt;28</td>
<td>60-285 mm</td>
<td>KF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.4&quot;-10.4&quot;</td>
<td></td>
<td>2.4&quot;-11.2'</td>
<td></td>
</tr>
<tr>
<td><strong>Medium Duty Type</strong></td>
<td><img src="image" alt="Medium Duty Type" /></td>
<td>5</td>
<td>225-350 mm</td>
<td>12</td>
<td>225-390 mm</td>
<td>KF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8.9&quot;-13.8&quot;</td>
<td></td>
<td>8.9&quot;-15&quot;</td>
<td></td>
</tr>
<tr>
<td><strong>Heavy Duty Type</strong></td>
<td><img src="image" alt="Heavy Duty Type" /></td>
<td>5</td>
<td>390-620 mm</td>
<td>5</td>
<td>390-620 mm</td>
<td>KF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15.4&quot;-24.4&quot;</td>
<td></td>
<td>15.4&quot;-24.4&quot;</td>
<td></td>
</tr>
<tr>
<td><strong>Extra Heavy Duty Type</strong></td>
<td><img src="image" alt="Extra Heavy Duty Type" /></td>
<td>14</td>
<td>450-1200 mm</td>
<td>14</td>
<td>450-1200 mm</td>
<td>KF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17.8&quot;-47.2&quot;</td>
<td></td>
<td>17.8&quot;-47.2&quot;</td>
<td></td>
</tr>
</tbody>
</table>

---

**The power of EPT®**

EMERSON
Industrial Automation

**CONFIDENTIAL**
Description Designations

Universal Joint Designator

Series
- LD = Light Duty (DIN flanges)
- LS = Light Duty (SAE flanges)
- MD = Medium Duty
- MK = Medium Duty with Flange Key
- HD = Heavy Duty
- HK = Heavy Duty with Flange Key

Shaft Type
- F = Fixed center, no slide
- T = Telescoping (standard catalog slide)
- S = Short slide design (less than standard)
- X = Special design
- N = No shaft/tube (Double Flange - Close Coupled)

Size
Flange OD / Swing Diameter (mm)

Flange
Number of holes * hole diameter (mm)

Length
Collapsed shaft separation (Lz dimension) in inches x 100 (no decimal)
For example: 133.42 inches

D for Double Flange Type (blank if not double flange)

Balance B if balance required, blank if no balance

U LD T 180/160 - 8*14 - 13342 D B
Types and Sizes

- SAE Flange - “Spicer” Standard
- Solid Eye Yoke
- In Stock
- 12 Sizes (3.54” to 9.84” Swing Diameter)
- Interchangeable with Dana/Spicer 128 to 188
- Sealed Spline With Special Coating for Zero Maintenance

ULST (Light Duty SAE) Series
Types and Sizes

- DIN Flange (Metric Standard)
- Solid Eye Yoke
- In Stock - 14 Sizes from 2.36” (58 mm) - 10.43” (265 mm) Swing Diameter
  - 59 Flange Configurations Available
- Flange Interchangeable with GWB, Johnson Power, Cline, Voith, Ameridrives, UniFlex, Traction, etc.
- Sealed Spline With Special Coating for Zero Maintenance
- Styles available – ULDT, ULDF, ULDS, ULDZ
Types and Sizes

- Split Eye Yoke with Serrated Split Cap
- In Stock - 5 Sizes from 8.86” (225 mm) to 13.8” (350 mm) Swing Diameter
  - 9 Flange Configurations Available
- Lube Fitting on Individual Caps for Ease of Maintenance - Standard Feature
- Flange Interchangeable with GWB, Johnson Power, Cline, Voith, Ameridrives, UniFlex, Traction, etc.
- Interchangeable with GWB Bearing Kit in Most Cases
- Styles available – UMDT, UMDF

UMDT (Medium Duty) Series
Types and Sizes

- Split Eye Yoke with Serrated Split Cap
- In Stock - 5 Sizes from 8.86” (225 mm) to 13.8” (350 mm) Swing Diameter
  - 9 Flange Configurations Available
- Lube Fitting on Individual Caps for Ease of Maintenance - Standard Feature
- Flange Interchangeable with GWB, Johnson Power, Cline, Voith, Ameridrives, UniFlex, Traction, etc.
- Interchangeable with GWB Bearings in Most Cases
- Styles available – UMKT, UMKF
Interchange Summary

- Flange Universal Joints are Flange to Flange or Functionally Interchangeable - Size for Size with All of the Competitors Like: GWB, Voith, Johnson Power, Cline Co., Traction and Others

- Most Major Components (like Cross & Bearing Kit) are Also Interchangeable with Competitors’ Components – See Kop-Flex Catalog KIP-04 For Details
## Interchange Chart

<table>
<thead>
<tr>
<th>Supplier series/ size</th>
<th>Tdw</th>
<th>Kop- Flex Range Only Interchangeable</th>
<th>Cross&amp; Bearing only Interchangeable</th>
<th>Bearing Interchangeable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIGHT SERIES SAE FLANGE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 128/ 131</td>
<td></td>
<td>ULS100/ 98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 135/ 137/ 141</td>
<td></td>
<td>ULS16/ 115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 148/ 155</td>
<td></td>
<td>ULS150/ 125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 161</td>
<td></td>
<td>ULS174/ 155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 171</td>
<td></td>
<td>USL203/ 160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 181</td>
<td></td>
<td>USL203/ 170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicer 188</td>
<td></td>
<td>USL245/ 178</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHT SERIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GWB 473.10</td>
<td>58/ 52-4*5</td>
<td>0.15</td>
<td>ULDT58/ 60-4*5</td>
<td>ULCKB62</td>
</tr>
<tr>
<td>GWB 473.20</td>
<td>65/ 62-4*6</td>
<td>0.25</td>
<td>ULDT65/ 60-4*6</td>
<td>ULCKB62</td>
</tr>
<tr>
<td>GWB 473.30</td>
<td>75/ 73-6*6</td>
<td>0.40</td>
<td>ULDT75/ 90-6*6</td>
<td>ULCKB62</td>
</tr>
<tr>
<td>GWB 287.00</td>
<td>90/ 88-4*8</td>
<td>0.76</td>
<td>ULDT90/ 90-4*8</td>
<td>ULCKB62</td>
</tr>
<tr>
<td>GWB 287.10</td>
<td>100/ 97-6*8</td>
<td>1.35</td>
<td>ULDT100/ 98-6*8</td>
<td>ULCKB62</td>
</tr>
<tr>
<td>GWB 287.20</td>
<td>120/ 116-8*10</td>
<td>2.40</td>
<td>ULDT120/ 115-8*10</td>
<td>ULD120/ 115-8*10</td>
</tr>
<tr>
<td>GWB 287.15</td>
<td>120/ 116-8*10</td>
<td>1.1</td>
<td>ULDT120/ 115-8*10</td>
<td>ULD120/ 115-8*10</td>
</tr>
<tr>
<td>GWB 287.20</td>
<td>120/ 125-8*10</td>
<td>1.8</td>
<td>ULDT120/ 125-8*10</td>
<td>ULD120/ 125-8*10</td>
</tr>
<tr>
<td>GWB 287.25</td>
<td>120/ 138-8*12</td>
<td>2.7</td>
<td>ULDT120/ 155-8*12</td>
<td>ULD120/ 155-8*12</td>
</tr>
<tr>
<td>GWB 287.30</td>
<td>150/ 156-8*12</td>
<td>4.0</td>
<td>ULDT150/ 156-8*12</td>
<td>ULD150/ 156-8*12</td>
</tr>
<tr>
<td>GWB 287.35</td>
<td>180/ 168-8*14</td>
<td>4.5</td>
<td>ULDT180/ 170-8*14</td>
<td>ULD180/ 170-8*14</td>
</tr>
<tr>
<td>GWB 287.42</td>
<td>225/ 178-8*16</td>
<td>6.5</td>
<td>ULDT225/ 178-8*16</td>
<td>ULD225/ 178-8*16</td>
</tr>
<tr>
<td>GWB 287.48</td>
<td>180/ 204-10*16</td>
<td>7.7</td>
<td>ULDT204/ 204-10*16</td>
<td>ULD204/ 204-10*16</td>
</tr>
<tr>
<td>GWB 287.50</td>
<td>225/ 251-8*16</td>
<td>8.5</td>
<td>ULDT225/ 251-8*16</td>
<td>ULD225/ 251-8*16</td>
</tr>
<tr>
<td>GWB 687.15</td>
<td>100/ 90-6*8</td>
<td>0.7</td>
<td>ULDT100/ 98-6*8</td>
<td>ULCKB90-1</td>
</tr>
<tr>
<td>GWB 687.20</td>
<td>120/ 98-8*10</td>
<td>1.0</td>
<td>ULDT120/ 115-8*10</td>
<td></td>
</tr>
<tr>
<td>GWB 687.25</td>
<td>120/ 113-8*10</td>
<td>1.6</td>
<td>ULDT120/ 125-8*10</td>
<td></td>
</tr>
<tr>
<td>GWB 687.30</td>
<td>120/ 127-8*10</td>
<td>1.9</td>
<td>ULDT120/ 125-8*10</td>
<td></td>
</tr>
</tbody>
</table>
# Interchange Chart

<table>
<thead>
<tr>
<th>Supplier series/ size</th>
<th>Tdw</th>
<th>Kop- Flex Flange Only Interchangeable</th>
<th>Cross &amp; Bearing only Interchangeable</th>
<th>Bearing Interchangeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWB 687.35</td>
<td>150/144-8<em>12, 180/144-8</em>14</td>
<td>2.9 ULDT150/155-8<em>12, ULDT180/155-8</em>14</td>
<td>ULCBK144</td>
<td></td>
</tr>
<tr>
<td>GWB 687.40</td>
<td>150/160-8<em>12, 180/160-8</em>14</td>
<td>4.4 ULDT150/160-8<em>12, ULDT180/160-8</em>14</td>
<td>ULCBK160-1</td>
<td>ULDT225/174-8*16</td>
</tr>
<tr>
<td>GWB 687.45</td>
<td>225/174-8*16</td>
<td>5.1 ULDT225/174-8*16</td>
<td>ULCBK174</td>
<td>ULDT225/174-8*16</td>
</tr>
<tr>
<td>GWB 687.55</td>
<td>180/178-10<em>16, 225/178-8</em>16</td>
<td>7.3 ULDT180/178-10<em>16, ULDT225/178-8</em>16</td>
<td>ULCBK178</td>
<td>ULDT180/178-10*16</td>
</tr>
<tr>
<td>GWB 687.65</td>
<td>180/204-10<em>16, 225/204-8</em>16</td>
<td>11 ULDT180/204-10<em>16, ULDT225/204-8</em>16</td>
<td>ULCBK204</td>
<td>ULDT180/204-10*16</td>
</tr>
<tr>
<td>GWB 190.50</td>
<td>225/225-8*16</td>
<td>8.5 ULDT225/204-8*16</td>
<td>UMCBK225-1</td>
<td></td>
</tr>
<tr>
<td>GWB 190.55</td>
<td>250/250-8*18</td>
<td>11 ULDT250/215-8*18</td>
<td>UMCBK250-1</td>
<td></td>
</tr>
<tr>
<td>GWB 190.60</td>
<td>285/285-8*20</td>
<td>17 UMDT285/250-8*20</td>
<td>UMCBK285-1</td>
<td></td>
</tr>
<tr>
<td>GWB 190.65</td>
<td>315/315-8*22</td>
<td>25 UMDT315/285-8*22</td>
<td>UMCBK315-1</td>
<td></td>
</tr>
<tr>
<td>GWB 190.70</td>
<td>350/350-10*22</td>
<td>36 UMDT350/285-10*22</td>
<td>UMCBK350-1</td>
<td></td>
</tr>
<tr>
<td>GWB 390.60</td>
<td>285/240-8*20</td>
<td>23 UMDT285/250-8*20</td>
<td>UMCBK240</td>
<td></td>
</tr>
<tr>
<td>GWB 390.65</td>
<td>315/265-8*22</td>
<td>36 UMDT315/285-8*22</td>
<td>UMCBK265</td>
<td></td>
</tr>
<tr>
<td>GWB 390.70</td>
<td>350/300-10*22</td>
<td>53 UMDT350/315-10*22</td>
<td>UMCBK300</td>
<td></td>
</tr>
<tr>
<td>GWB 292.50/392.50</td>
<td>225/225-8*16</td>
<td>23 UMKT225/225-8*16</td>
<td>UMCBK225</td>
<td>UMKT225/225-8*16</td>
</tr>
<tr>
<td>GWB 292.55/392.55</td>
<td>250/250-8*18</td>
<td>36 UMKT250/250-8*18</td>
<td>UMCBK250</td>
<td>UMKT250/250-8*18</td>
</tr>
<tr>
<td>GWB 292.65/392.65</td>
<td>315/315-10*22</td>
<td>75 UMKT315/315-10*22</td>
<td>UMCBK315</td>
<td>UMKT315/315-10*22</td>
</tr>
<tr>
<td>GWB 292.70/392.70</td>
<td>350/350-10*22</td>
<td>102 UMKT350/350-10*22</td>
<td>UMCBK350</td>
<td>UMKT350/350-10*22</td>
</tr>
<tr>
<td>GWB 292.75/392.75</td>
<td>390/390-10*24</td>
<td>140 UHKT390/390-10*24</td>
<td>UMCBK300</td>
<td></td>
</tr>
<tr>
<td>GWB 292.80/392.80</td>
<td>435/435-16*27</td>
<td>220 UHKT440/440-16*28</td>
<td>UMCBK300</td>
<td></td>
</tr>
<tr>
<td>GWB 292.85/392.85</td>
<td>480/480-16*30</td>
<td>285 UHKT490/490-16*31</td>
<td>UMCBK300</td>
<td></td>
</tr>
<tr>
<td>GWB 292.90/392.90</td>
<td>550/550-16*30</td>
<td>435 UHKT550/550-16*31</td>
<td>UMCBK300</td>
<td></td>
</tr>
</tbody>
</table>
Unique Features and Benefits

- Available for Shipments in 48 hours to 2 Weeks
- Industry Standard Flanges Bolt up to Existing Companion Flanges/Rigids
- Most Major Components Interchangeable with Commonly Available Components
- Maintenance Cost Savings: Sizes up to 215 mm Do Not Require Lubrication of Splines - Special Polymide 6 Coated Splines - Standard Feature Unique to Kop-Flex
- Sizes 215 & Larger have Lube Fittings on Each Bearing Cap for the Ease of Lubrication - Standard Feature that No One Offers
Value Added Services

- Only North American Manufacturer to Offer Complete Range of the Universal Joints from 58 mm (2.3”) to 1200 mm (47”) Swing Diameter
- Largest Coupling/U-Joint Technical Sales & Engineering in North America
- State-of-the-Art Repair Facilities in Baltimore, USA and Toronto, Canada
- One Stop Shop For All Couplings, Gear Spindles and Universal Joints
**Information Needed for Selection**

- **New Application:**
  - Type of Application; Power (hp); Universal Joint Operating Speed (rpm); & Length - Distance Between Shaft Ends (DBSE) or Collapsed Length (Lz)
  - Are Rigid or Companion Flanges Required? If Yes, then Bore Requirements
  - Special Requirements i.e. High Misalignment, Special Slide, Balance, etc.

- **Retrofit or Replacing Competitors’:**
  - Competitor’s Size Designation (i.e.: GWB190.65) & Length
How to Order from Kop-Flex?

- Required Data - See Previous Slide or Kop-Flex Catalog
- Call Local EPT or Kop-Flex Sales Representative
- Visit website www.Emerson-EPT.com
- Call Kop-Flex Plant
  - US: 410-768-2000
  - Canada: 416-675-7144
Available Resources

- Internet: www.emerson-ept.com
  - Price, Availability, Order Entry
  - Product Selections
  - Smart Interchanges
  - CAD Drawings
  - eCatalog
  - Media Library
- EPT Customer Service (800-626-2120)
  - Price, Availability, Order Entry
- Technical Services – Standard Product (800-626-2093)
- Standard / Mill / High Performance (410-768-2000)
  - Technical Product Questions
  - Application & Interchange Assistance