

Ameridrives

Nuttall Gear

Stromag

TB Wood's

Twiflex

Wichita Clutch

Power Transmission Solutions for Hydraulic Fracturing Applications



ALTRA INDUSTRIAL MOTION PROVIDES ADVANCED POWER TRANSMISSION SOLUTIONS FOR HYDRAULIC FRACTURING APPLICATIONS

The well recognized brands of Altra Industrial Motion supply technically advanced universal joints, couplings, clutches, brakes, gearing and belted drives for all types of truck- and trailer-mounted hydraulic fracturing pump and blender units. All Altra products are designed to withstand the often harsh, rugged conditions of oil and gas shale plays in North America and around the world.



Altra Brands Deliver Value Throughout the Drivetrain

With industry-leading brand names, including Ameridrives, TB Wood's, Wichita Clutch, Twiflex, Stromag and Nuttall Gear, Altra Industrial Motion is positioned to provide OEMs with exceptional drivetrain value by ensuring component compatibility and optimized performance combined with time-saving, single-source convenience.

Extensive Technical Experience in Hydraulic Fracturing Applications

Major stimulation OEMs routinely rely on the hydraulic fracturing application knowledge of Altra's engineering teams who collaborate to thoroughly analyze specific customer applications and then apply the latest technologies in design, materials and manufacturing. Whether a modified standard product or a custom solution is required, Altra provides complete sales and engineering support to customers around the world from the very first concept to the detailed planning, design phase and commissioning.

For more information about power transmission solutions for hydraulic fracturing applications from Altra Industrial Motion, including case studies, literature, and service manuals, visit

www.altramotion.com/HydraulicFracturing



ALTRA PRODUCTS HELP KEEP PUMP AND BLENDER UNITS RUNNING SMOOTHLY

Universal Joints/Driveshafts

Ameridrives J-Series driveshafts are designed for truck-mounted fracking pump applications. Units feature wing-style yokes for fast and easy on-site maintenance and replacement. Series 3000 models with closed-eye yokes are also utilized. Series 2000 U-joints are often installed on auxiliary drives.

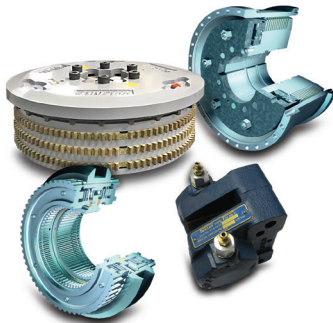
Ameridrives



Couplings

Ameridrives gear couplings and TB Wood's Sure-Flex® Plus and Dura-Flex® elastomeric couplings provide reliable performance on pump driveshafts and blender cooling fan drives. Ameridrives Ameriflex diaphragm couplings are used on high-speed turbine-driven electric fracking pump units. Stromag Periflex® couplings are also utilized.

Ameridrives • TB Wood's • Stromag



Clutches and Brakes

Wichita Clutch and Stromag clutches along with Twiflex brakes provide reliable engagement/disengagement and stopping functionality on fracking pump drive applications. These rugged-duty components are typically installed between the transmission and pump.

Stromag • Wichita Clutch • Twiflex



Gearing

Nuttall provides through-hardened or case-hardened helical and spur gears and pinions up to AGMA Quality 12. The gearing is often utilized on positive displacement pump drives.

Nuttall Gear



Belted Drives

TB Wood's sheaves and V-belts are used on cooling fan drives. Sheaves are machined for vibration-free performance at speeds up to 6500 FPM. Belts are available in wrapped or cog construction and all are static conducting, and oil and heat resistant.

TB Wood's

DIESEL-POWERED PUMP TRUCK



Belted Drives

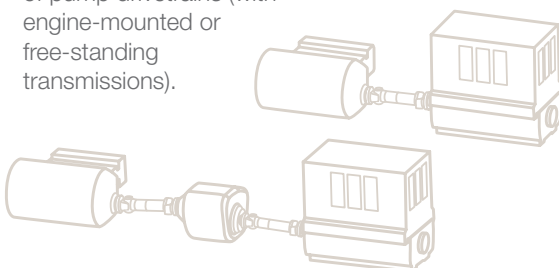
TB Wood's sheaves and V-belts provide reliable performance on radiator cooling fan drives.



Driveshafts, Couplings & Gearing

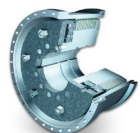
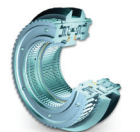
Ameridrives J-Series driveshafts are designed for fracking pump applications. Units feature wing-style bearings for easy installation and maintenance. 3000 Series driveshafts are also widely used on these applications. Loose gearing from Nuttall Gear and Stromag Periflex couplings are often utilized on positive displacement pump drives.

Ameridrives driveshaft solutions can be incorporated in all types of pump drivetrains (with engine-mounted or free-standing transmissions).



Clutches & Brakes

Stromag clutches along with Twiflex brakes provide reliable engagement/disengagement and stopping functionality on diesel powered fracking pump drive applications. These rugged-duty components are typically installed between the gearbox and pump. Wichita Clutch are also installed on pump drives.



BLENDER TRUCK

Driveshafts & Clutches

Series 2000 U-joints are utilized on blender auxiliary drives. Models feature high torque capacity and one-piece yoke and bearing housing construction.



Elastomeric Couplings

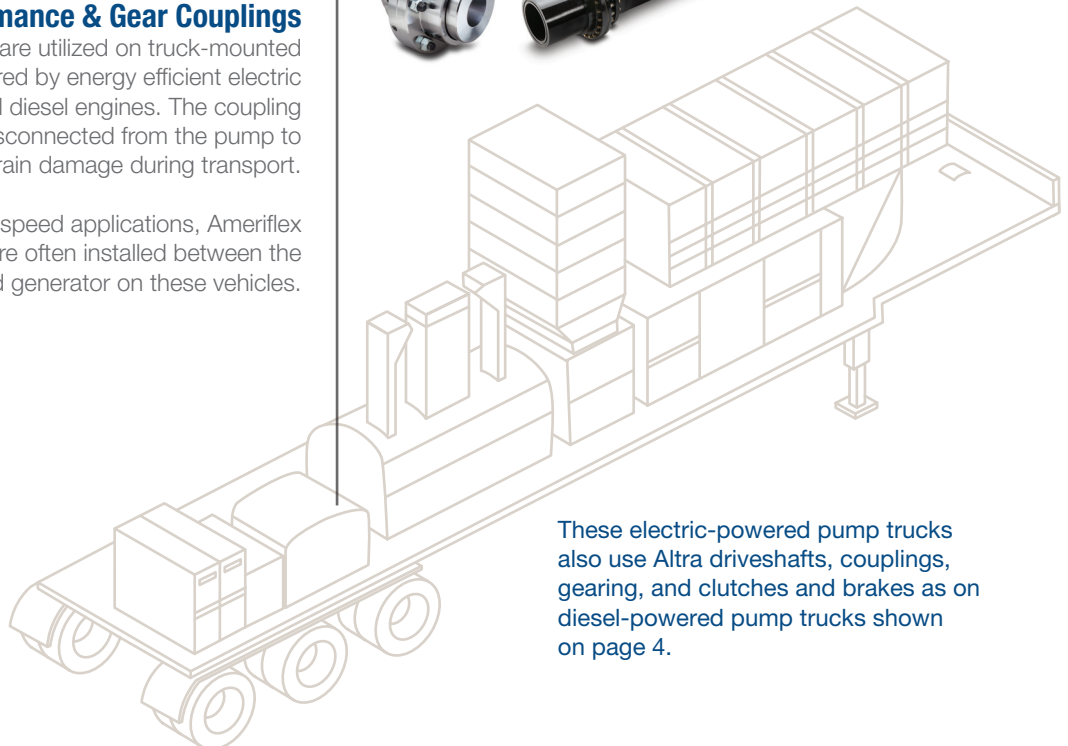
TB Wood's Sure-Flex Plus and Dura-Flex couplings are often installed on centrifugal pumps.

ELECTRIC-POWERED PUMP TRUCK

High Performance & Gear Couplings

Ameridrives gear couplings are utilized on truck-mounted pumps that are powered by energy efficient electric motors instead of traditional diesel engines. The coupling allows the motor to be disconnected from the pump to prevent drivetrain damage during transport.

Designed for high-speed applications, Ameriflex diaphragm couplings are often installed between the turbine and generator on these vehicles.



These electric-powered pump trucks also use Altra driveshafts, couplings, gearing, and clutches and brakes as on diesel-powered pump trucks shown on page 4.

The Altra Advantage

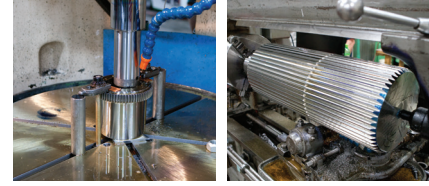
A LEGACY OF DRIVESHAFT / UNIVERSAL JOINT INNOVATION

Since its founding in 1928 as Zurn Industries, Ameridrives has been the North American market leader in the supply of industrial couplings for the most critical and demanding applications.

In 2006, Altra Industrial Motion acquired All-Power Transmission, a leader in small drive shafts, further expanding our universal joint product line. In 2017, we consolidated our design and manufacturing operations to our state-of-the-art facility in San Marcos, TX.

With decades of being the industry-leader in U-Joints and driveshafts for the metals (mills and recycling) and mining markets, Ameridrives utilized a vast wealth of knowledge and experience to design driveshafts specifically for hydraulic fracturing pump applications.

We offer new driveshafts, spares, redesigns or upgrades and stocked inventory to help keep your oil and gas hydraulic fracturing operations competitive.



We are the OEM

- Key engineers with many years of industrial driveshaft design experience
- Pool of trained technicians with extensive driveshaft manufacturing experience
- Knowledgeable engineering, sales force and customer support groups

Quality & Technology

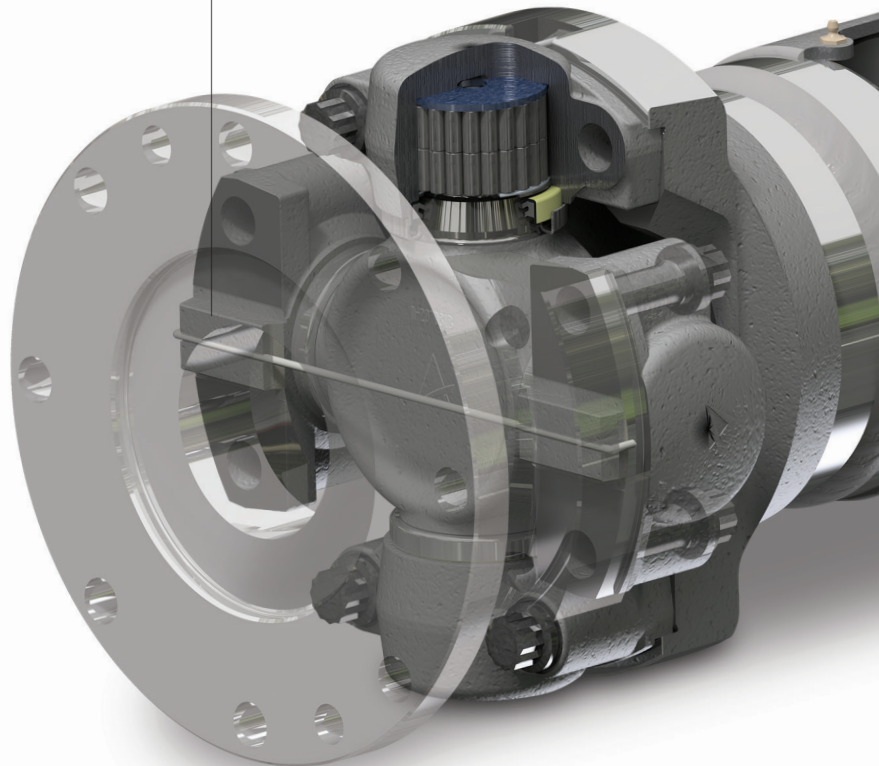
- Made in USA
- Larger, more robust center section design
- Ideal loading across entire bearing surface as a result of FEA analysis insuring balanced deflection between the yoke and cross
- One-piece yoke reduces the number of extra bolted connections and serrations to wear and maintain
- Heat-treated alloy steel components and nitride-splined travel sections available upon request for improved durability
- Dynamic balancing of driveshafts

Convenient Proximity to Oil and Gas Fields

- World class design and manufacturing facility located in San Marcos, TX is close to major North and Central America oil and gas shale plays

J-SERIES DRIVESHAFTS

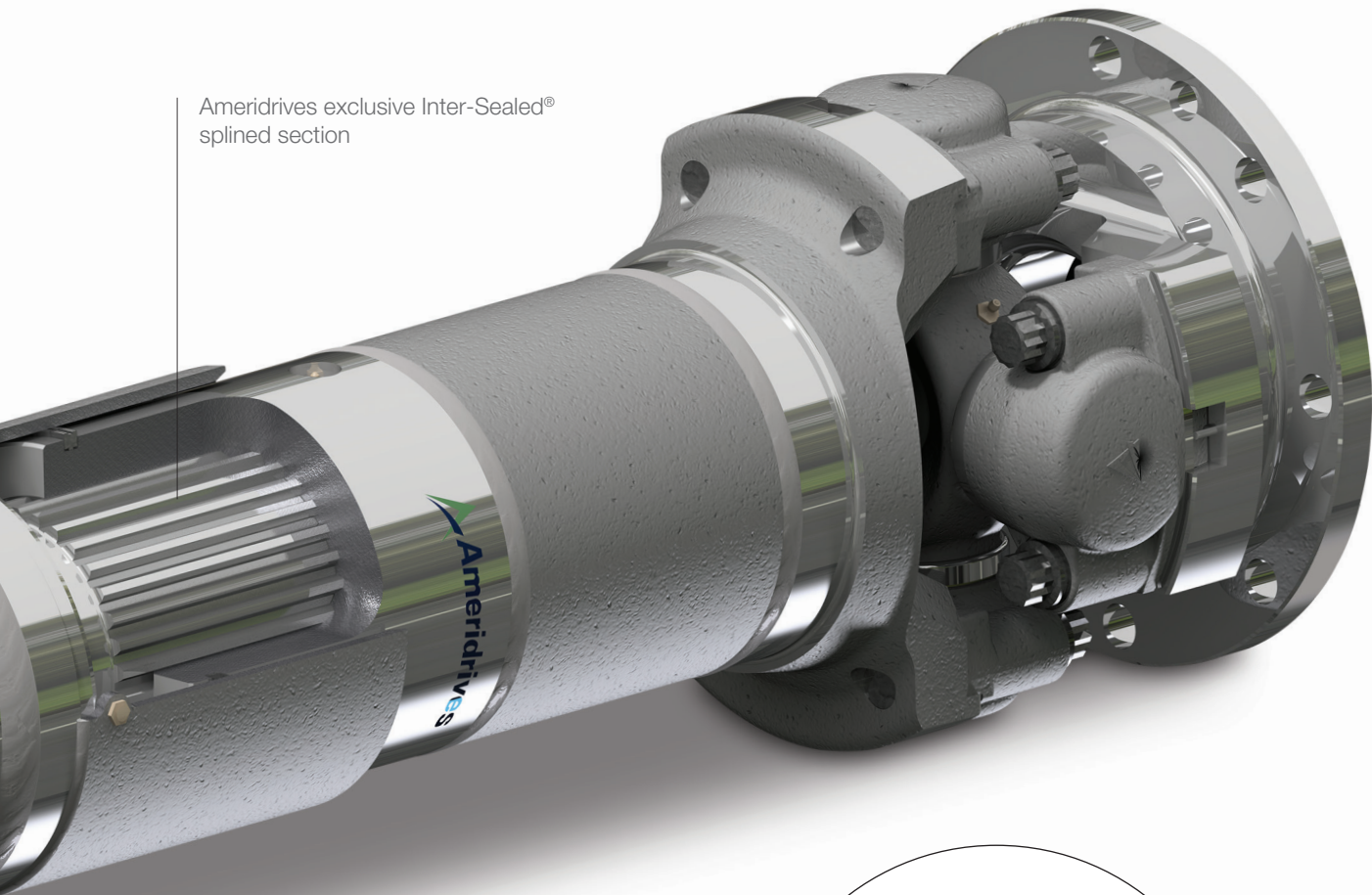
Wing-style bearings allow for easy maintenance in the field



Ameridrives 3000 Series and J-Series features:

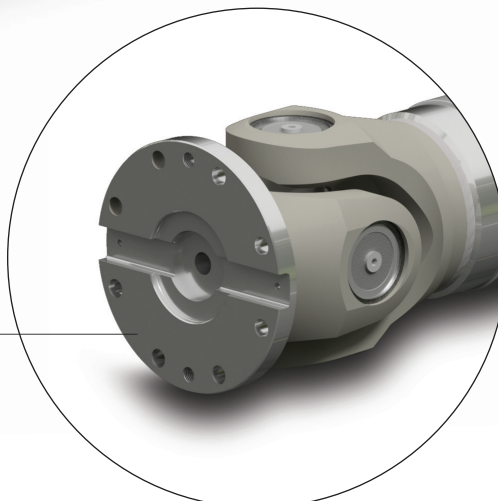
- 52100 bearing steel
- Crowned roller reduces stress concentration
- Multiple rows decrease skewing and end loading
- Splined or keyed fitting yoke & DIN flange connections
- Special lengths upon request

Ameridrives exclusive Inter-Sealed®
splined section



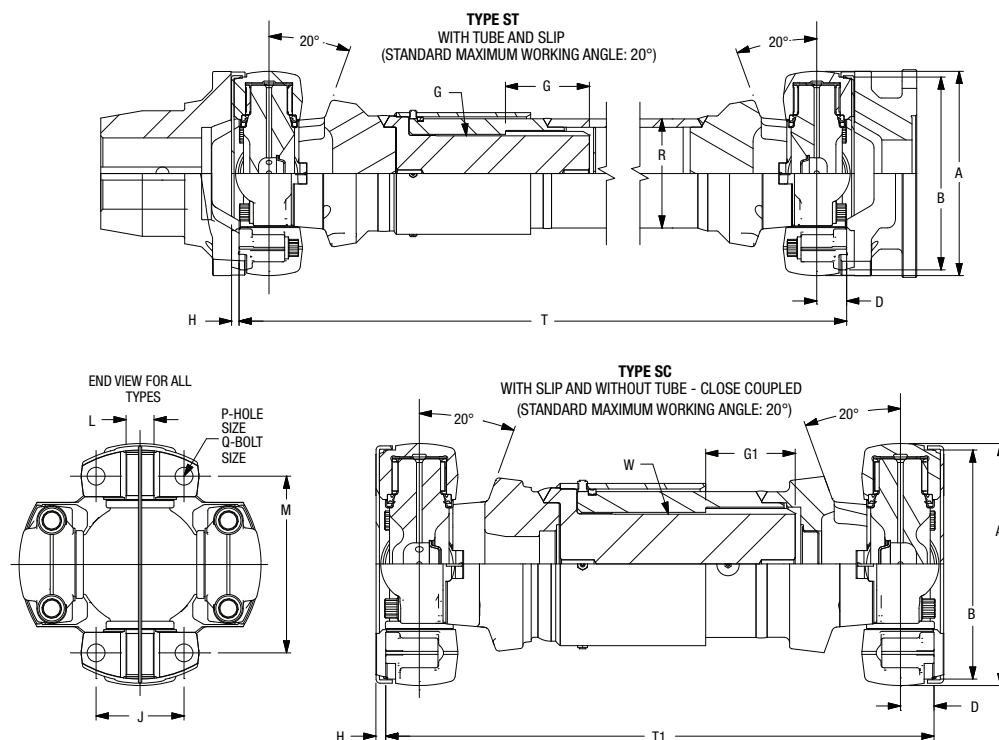
3000 SERIES DRIVESHAFTS

Closed-eye style offers higher torque density



Driveshafts

J SERIES (WING-STYLE)



Size	J800F		J1200F		J6000		J6500	
Torque Ratings								
	Lb. Ft.	Nm	Lb. Ft.	Nm	Lb. Ft.	Nm	Lb. Ft.	Nm
Tdw	14,500	19,659	20,800	28,201	22,124	30,000	33,188	45,000
Tk	18,000	24,405	26,000	35,251	44,985	61,000	57,525	78,000
BL	13,337	18,083	20,005	27,123	22,861	31,000	32,039	43,440
Minimum Length/Length Compensation								
	inch	mm	inch	mm	inch	mm	inch	mm
T (ST)	27.30	693.42	30.44	773.18	27.30	693.42	31.94	811.28
T1 (SC)	24.50	622.30	27.70	703.58	24.50	622.30	29.43	747.52
G (ST)	5.00	127.00	5.00	127.00	5.00	127.00	5.51	140.00
G1 (SC)	4.00	101.60	4.00	101.60	4.00	101.60	3.00	76.20
Dimensional Data								
B (ST & SC)	20°		20°		20°		20°	
	inch	mm	inch	mm	inch	mm	inch	mm
A	10.75	273.05	12.18	309.37	11.10	281.94	12.53	318.26
B	10.236	259.99	11.500	292.10	10.236	259.99	11.500	292.10
D	1.50	38.10	1.78	45.21	1.50	38.10	1.78	45.21
H	0.44	11.18	0.44	11.18	0.44	11.18	0.44	11.18
W	5 1/128-29		5 1/128-29		5 1/128-29		5 43/64-33	
S	0.500	12.70	0.500	12.70	0.500	12.70	0.500	12.70
J	3.936	99.97	4.640	117.86	3.936	99.97	4.640	117.86
L	1.2485	31.71	1.2485	31.71	1.2485	31.71	1.2485	31.71
M	7.872	199.95	8.880	225.55	7.872	199.95	8.880	225.55
P	51/64	20.24	59/64	23.42	51/64	20.24	59/64	23.42
Q	3/4-16		7/8-14		3/4-16		7/8-14	

One-Way Endurance Torque $T_{ow} = 1.5 \times T_{dw}$

A Swing Diameter

B Pilot Diameter of Mating Part

D Bearing Height

G Slip

H Height of Key

J Bolt Hole Spread Across Bearing Wings

W Spline Diameter – Number of Teeth

Q Bolt Size

T Compressed Length

Face-to-Face of Bearings

K Flange Face-to-Face

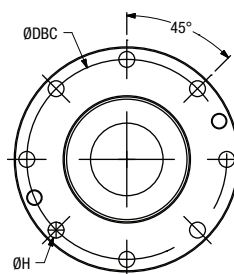
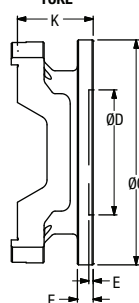
M Bolt Hole Spread Across Yoke

P Bolt Hole Diameter

WING-STYLE FLANGED FITTING YOKES

DIN 285/315

DIN FLANGED FITTING
YOKE

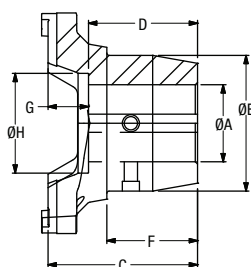


C Flange Diameter
D Pilot Diameter
E Pilot Depth
F Flange Thickness
K Length Face-to-Face
H Hole Size

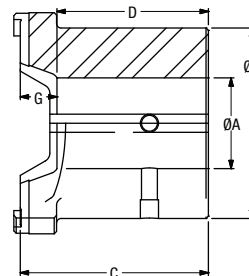
Size	J800F		J1200F		J6000		J6500	
Dimensional Data								
	inch	mm	inch	mm	inch	mm	inch	mm
C	11.220	285.00	12.400	315.00	11.220	285.00	12.400	315.00
D	6.890	175.00	6.890	175.00	6.890	175.00	6.890	175.00
E	0.240	6.10	0.280	7.11	0.240	6.10	0.280	7.11
F	0.790	20.07	0.870	22.10	0.790	20.07	0.870	22.10
K	3.130	79.50	4.175	106.05	3.130	79.50	4.175	106.05
H	0.795	20.19	0.874	22.20	0.795	20.19	0.874	22.20

WING-STYLE FITTING YOKES

DESIGN 1



DESIGN 2

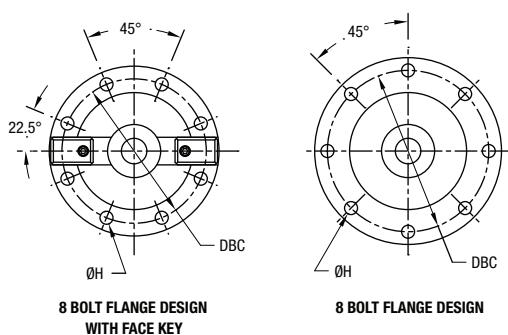
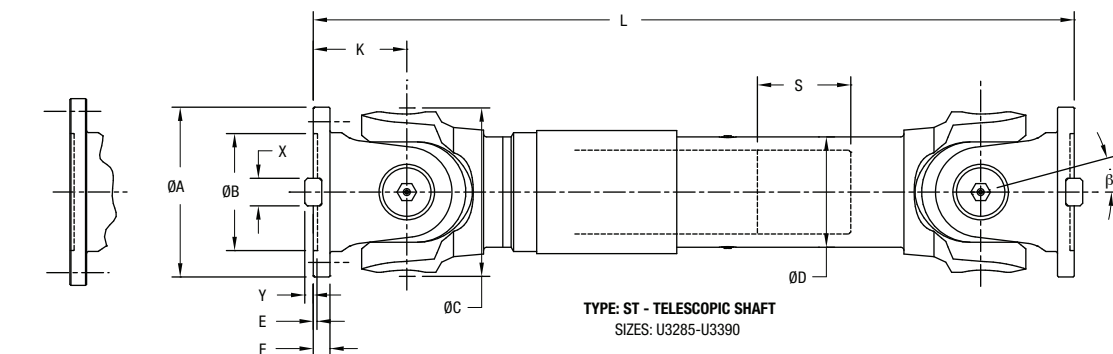


A Bore Diameter
C Length Face-to-Face
D Bore Length
G Face to Shaft End
H Pilot Diameter
E Barrel Diameter

Size	J800F		J1200F		J6000		J6500	
Dimensional Data – Design 1								
	inch	mm	inch	mm	inch	mm	inch	mm
A (min)	—	—	2.250	55.13	—	—	2.250	55.13
A (max)	—	—	5.030	123.24	—	—	4.000	98.00
C	—	—	8.250	202.13	—	—	8.250	202.13
D	—	—	6.000	147.00	—	—	6.000	147.00
F	—	—	5.000	122.50	—	—	5.000	122.50
G	—	—	2.250	55.13	—	—	2.250	55.13
H	—	—	—	—	—	—	—	—
Dimensional Data – Design 2								
A (min)	3.250	79.63	4.500	110.25	3.250	79.63	4.500	110.25
A (max)	6.000	147.00	7.040	172.48	6.000	147.00	7.040	172.48
C	9.000	220.50	10.000	245.00	9.000	220.50	10.000	245.00
D	7.000	171.50	7.850	192.33	7.000	171.50	7.850	192.33
E	9.250	226.63	7.750	189.88	9.250	226.63	7.7750	189.88
G	2.000	49.00	1.800	44.10	2.000	49.00	1.800	44.10

Driveshafts

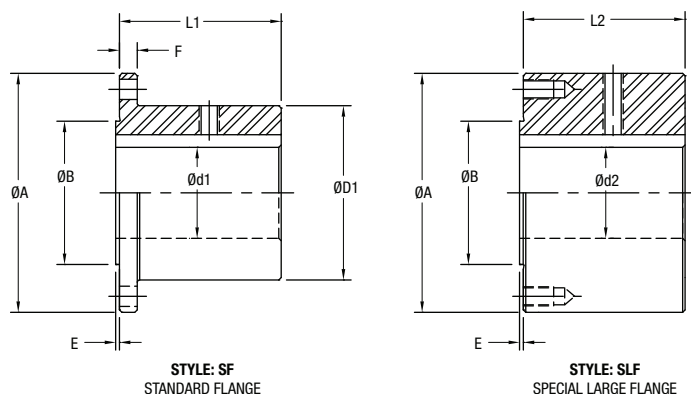
3000 SERIES (CLOSED-EYE)



- A Flange Diameter
- B Pilot Diameter
- C Swing Diameter
- D Drive Tube Diameter
- E Pilot Depth
- F Flange Thickness
- K Face-to-Joint Center
- H Bolt Size
- X Keyway Width
- Y Keyway Depth

3000 SERIES COMPANION FLANGES/HUBS

DIN 285/315



Size	U3250		U3285	
Torque Ratings				
	Lb. Ft.	Nm	Lb. Ft.	Nm
Tdw	22,117	30,000	34,517	46,800
Tk	44,833	60,800	71,833	97,400
BL	20,675	28,000	30,367	41,200
Minimum Length/Length Compensation				
	inch	mm	inch	mm
T (ST)	36.81	935	46.85	1,190
G (ST)	5.00	127	5.51	140
Dimensional Data				
β (ST & SC)	15°		15°	
A	11.22	285	12.40	315
B	6.89	175	6.89	175
C	9.84	250	11.22	285
D	6.50	165	7.75	197
E	0.28	7	0.28	7
F	0.79	20	0.87	22
K	5.51	140	6.30	160
DBC	9.65	245	11.02	280
BOLT QTY	8	8	8	8
H	0.79	20	0.87	22
X	—	—	—	—
Y	—	—	—	—

Size	U3250				U3285			
Dimensional Data								
	SF		SLF		SF		SLF	
	inch	mm	inch	mm	inch	mm	inch	mm
A	11.22	285	11.22	285	12.40	315	12.40	315
B	6.89	175	6.89	175	6.89	175	6.89	175
E	0.24	6	0.24	6	0.24	6	0.24	6
F	0.81	21	—	—	0.88	22	—	—
L1	7.00	178	—	—	8.0	203	—	—
D1	8.41	214	—	—	6.44	164	—	—
d1	5.56	141	—	—	6.44	164	—	—
L2	—	—	9.38	238	—	—	10.25	260
d2	—	—	7.50	191	—	—	8.25	210

- A Flange Diameter
- B Pilot Diameter
- E Pilot Depth
- F Flange Thickness
- L1 Hub Length – Style 1
- D1 Barrel Diameter – Style 1
- d1 Max Bore Diameter – Style 1
- L2 Hub Length – Style 2
- d2 Max Bore Diameter – Style 2

REBUILD SERVICE

Remanufactured Driveshafts/Universal Joints Look Like New, Warrantied Like New

Ameridrives Rebuild Service Department can refurbish your universal joints. We take your worn, scaled, seized, scored, or rough running U-joints and make them like new...for substantially less than the replacement cost.

As a major manufacturer of universal joints, we have the people, facilities, and experience to rebuild and replace all components as needed. The same standards of excellence that exist in the manufacture of original equipment U-joints are closely adhered to in the overhaul procedure of every rebuilt universal joint.



The difference is not just cosmetic.



The Rebuild Service Department will inspect, refurbish or replace your universal joint to original specifications with a new warranty.



Consider these advantages:

The Rebuild Service Department will perform the following procedures to restore your universal joint to original specifications with a new warranty.

- Price – A savings of approximately 30% (compared to list price for a new unit)
- Speed – Universal joints are received, inspected and rebuilt in the shortest possible time frame
- Warranty – 1 Year on labor and materials, same as new universal joints
- Emergency Breakdown Program

Contact your Altra representative for details on our cost-saving program.

Universal Joints

SELECTION INFORMATION

I. Speed Limit Based on Limits of Mass Acceleration

When universal joints are operated at any angle greater than zero, the center section of the universal joint always runs irregularly, being accelerated and decelerated twice in every revolution. The maximum values of mass acceleration torque arising here are dependent on the operating speed and angle of deviation β and upon the moment of inertia of the center shaft section [RPM x A].

To ensure smooth running of the universal joint, the mass acceleration torque must not be allowed to exceed the limits shown in Table 1.

II. Speed Limit Based on Lateral Critical Speed

In applications where long lengths of shafts are required, the speed is restricted by the lateral critical speed of the center section. This speed is a function of the center tube diameter wall thickness, and the effective length. The maximum operating speed must be less than the lateral critical speed N_c shown in Table 2.

NOTE:

Allowable Operating Speed = $N_c \times .75$.

In many applications, operation at 1/2 critical speed will also create unacceptable vibration. For these applications the operating speed should be 8% above or below 50% of the maximum indicated.

For flange-to-flange lengths greater than shown, or if allowable speed is exceeded, contact Ameridrives.

III. Balancing

All standard universal joints under 300 RPM are supplied unbalanced. Between 300-850 RPM they are balanced if required. Consult factory for further information. Over 850 RPM all universal joints are normally supplied balanced. Please consult the factory for special balancing requirements.

Table 1

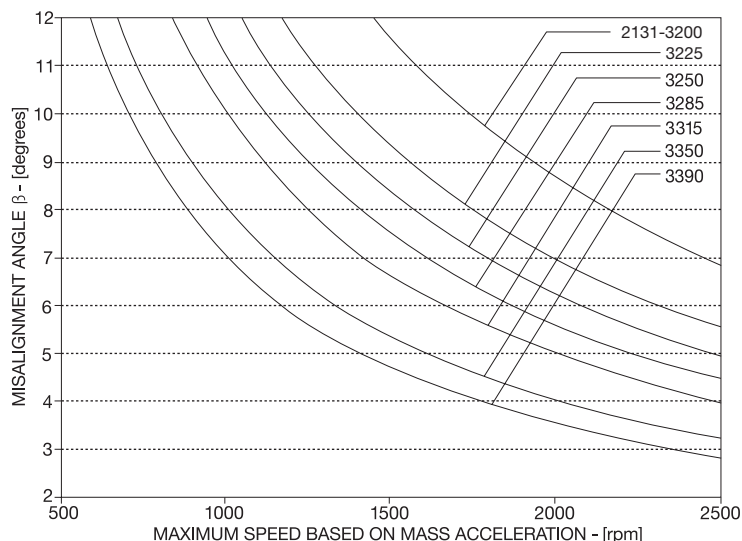
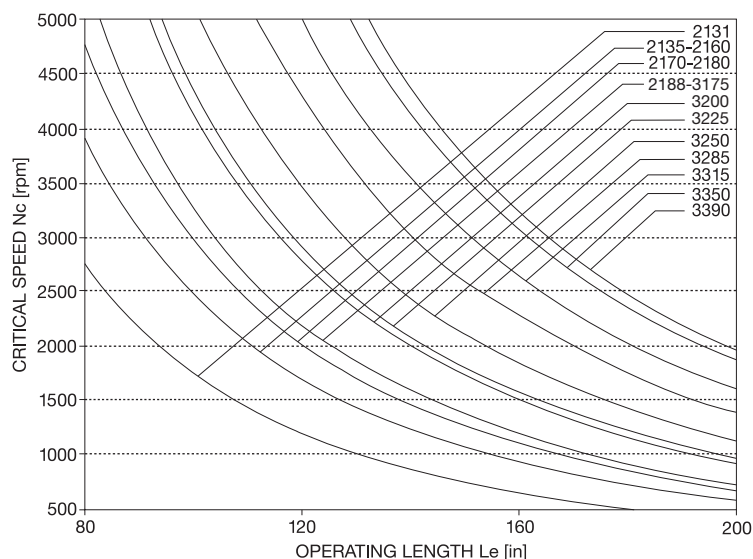


Table 2



The speed limits on this page are only a guide. The actual limits are determined by the characteristics of the system in which the universal joint is installed.

SELECTION PROCEDURE

Endurance torque (T_{dw}) is the normal rating for fully reversing torque based on material strength.

Bearing Life torque (B_L) is the bearing life rating of the universal joint. This torque is based on the B-10 life of the universal joint bearings. The life torque values listed are based on 5000 hours B-10 bearing life at 3° misalignment and 100 RPM. B-10 life is defined as the minimum life expectancy for a 90% probability of survival. Typically the average actual operating life of the bearings is 5X the calculated B-10 life.

Peak torque (T_k) is the maximum allowable torque based on the yield strength capacity of the joint.

The torque ratings are based on material strength. When approaching these limits the capacity of the desired flange connection should be verified. When the selection torque (T_s) approaches the endurance torque (T_{dw}) or when the maximum torque approaches the peak torque capacity (T_k) of the universal joint, integral face pads are recommended. The number of pads and bolts are customized on a per application basis. Hirth radial teeth are also available on a per application basis.

Universal Joint Selection

- I. Calculate application torque (T_a) and selection torque (T_s).

$$T_a = \frac{HP \times 63025}{N} \quad (\text{lb. x in.})$$

$$T_a = \frac{KW \times 9550}{N} \quad (\text{Nm})$$

N = Speed (RPM)

T_s = Selection Torque = $T_a \times$ Service Factor

T_s must be less than T_{dw} for reversing torque applications or T_{ow} for one way pulsating torque applications.

- II. Check to see if life is sufficient.

$$L_h = \frac{1.5 \times 10^6}{A \times N} \left[\frac{B_L}{T} \right]^{(10/3)}$$

Where:

L_h = B-10 Life in Hours

A = Operating Angle in Degrees

N = Speed (RPM)

B_L = Life Torque

T_a = Application Torque

- III. Duty Cycle: In applications where the torque, speed and operating angle vary predictably during a typical load cycle or operational sequence, a duty cycle can be determined. First the load cycle must be analyzed and divided into groups of fixed combinations of torque, speed and operating angle. These groups represent percentages of the total operating time of the load cycle. Life expectancy can then be calculated using Miner's Theory, which takes into account the cumulative effect resulting from operating at varying conditions.

The total life expectancy can be calculated using the following equation:

$$\text{Total Life Expectancy} = \frac{1}{\frac{N_1}{L_1} + \frac{N_2}{L_2} + \frac{N_3}{L_3} + \dots + \frac{N_m}{L_m}}$$

Where:

N_1 = fraction of total, time at operating condition 1

L_1 = life expectancy at operating condition 1 (hours)

m = total number of operating conditions

- IV. Determine Peak Torque conditions.

T_k must exceed the maximum operating torque.

- VI. Other considerations:

There are many other items that can determine the size of a universal joint. These include:

1. Diameter and length limitations.
2. Bore size.
3. Equipment restrictions on forces and moments.
4. Speed limits (see Tables 1 and 2)
 - a. due to mass acceleration as a function of misalignment
 - b. critical speed of center shaft

Telescopic splines are available on ST and FT designs. The splined axial travel sections are required to accommodate movement of the driven end such as a roll position change or axle jounce. SF and FF shaft are properly selected for applications where the roll end has relatively small movements of the driven side along with a clearance or slip fit roll end connection. The amount of required axial movement can be calculated by multiplying the centerline to centerline of the universal joint yokes by 1 minus the cosine of the operating angle for each position.

Nitrided or coated splines are available on request.

Longer or shorter travel is available. Consult Ameridrives.

Additional Hydraulic Fracturing Products

Couplings, U-Joints & Gearing



Ameridrives **Amerigear Gear Couplings**

Fully-crowned gear teeth provide operational benefits including maximum load-carrying capacity with minimum size, maximum reliability and long life.

- Both "O" ring and metal seal models are available
- Strong, rigid floating sleeve
- Precision-machined identical hubs
- Positive dust-tight seals
- Conforms to AGMA standards
- 3/4° to 1-1/2° operating angle



TB Wood's **Sure-Flex® Plus Couplings**

Sure-Flex Plus EPDM and Neoprene sleeves are best-in-class for coupling performance and value. Their 4-way flexing action absorbs virtually all types of shock, misalignment, and end float.

- High Torque Rating - 30% Increased Torque Rating, EPDM and Neoprene
- Longer Life - Sure-Flex Plus Lasts Over 3X Longer than the Competition
- Better Value - Save Money Using a Smaller Coupling
- Interchangeable - Retrofits to Existing Flanges



TB Wood's **Dura-Flex® Couplings**

Dura-Flex couplings "split-in-half" element design allows for easy element installation/replacement without moving connected equipment or disturbing the shaft connection. Spacer design can accommodate a large range of shaft spacing with few parts.

- Easy to assemble/replace
- High misalignment ratings



Ameridrives **Ameriflex® Diaphragm Couplings**

The Ameriflex multiple convoluted diaphragm coupling has continued to set new standards for life and reliability in high performance machinery applications. Using the latest design and manufacturing technology, Ameridrives is able to offer increased diaphragm coupling performance without compromising this outstanding reliability.

- Designed for infinite life
- High torque to diameter and weight ratio
- Diaphragms are 15-5PH stainless steel
- Diaphragms are shot-peened for improved fatigue strength and corrosion resistance
- Low bending moments and axial force result in lower bearing loads
- High axial travel
- Multiple separated diaphragms provide a built in safety feature
- Field replaceable flex-element assemblies API-671 Compliant



Ameridrives **U-Joints**

Units feature high torque capacity and one piece yoke and bearing housing construction.

- Made in U.S.A.
- Long bearing life
- High operating angle capability
- Eliminates unnecessary bolted connections and serrations in yokes
- Heat treated alloy steel components
- Dynamic balancing of driveshafts



Stromag **Periflex® VN Couplings**

A highly flexible elastomer coupling with linear spring characteristic ideal for diesel engine drives. The new compound has been developed for higher temperature stability and is suitable up to 120 °C ambient temperature.

- Improved media resistance against oil and ozone
- High mechanical strength
- Good abrasion resistance
- Sizes according to SAE standard



Nuttall Gear **Loose Gearing**

Nuttall provides through-hardened or case-hardened helical and spur gears and pinions up to AGMA Quality 12. The gearing is often utilized on positive displacement pump drives.

Clutches, Brakes & Belted Drives



Wichita Clutch Standard Vent Clutches

The standard vent combination clutch coupling, unaffected by centrifugal force, is designed for reliable in-line power transmission.

It is unaffected by centrifugal force and has no self-energization like drum clutch designs. Ideally suited for large inertia loads where smooth controlled starts are needed.

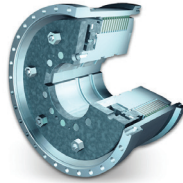


Twiflex T20 Caliper Brakes

The standard T20 disc brake is split-caliper design.

Normally one or two calipers are used per disc, but the number may be increased depending on disc size.

- 300mm minimum disc diameter
- Brakes may be positioned at any angle around the periphery of the disc.



Stromag KMS Wet Running Multi-Disc Clutches

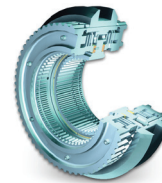
Oil-cooled and hydraulically-operated multi-disc clutches are used where high torques must be transmitted reliably in the smallest spaces.

- Excellent torque to weight ratio
- Low mass moment of inertia
- High thermal load capacity
- Switching heat dissipated by internal oil cooling
- Long service life of the discs
- Low maintenance, any disc wear automatically compensated by piston travel
- Remote control capability
- Mechanical emergency operation device in case of hydraulic oil supply failure



TB Wood's Belted Drives

TB Wood's sheaves and V-belts are used on cooling fan drives. Sheaves are machined for vibration-free performance at speeds up to 6500 FPM. Belts are available in wrapped or cog construction and all are static conducting, and oil and heat resistant.



Stromag Synchro SYE 2700 Clutches

Mechanically actuated multi-disc synchronizations for use in multi-speed industrial gears. The combination of friction engagement for the synchronisation phase and positive locking for the actual power transmission results in a smaller mounting space than for purely frictionally engaged clutches.

- Suitable for rated torques up to 27,000 Nm and speeds up to 3000 rpm
- Short-time admissible max torque up to 45,000 Nm
- Torque peaks can be absorbed reliably by the pre-tensioned gears
- High heat capacity of the discs compared with conical systems
- Reliable synchronisation of high inertias and drag torques
- Precise guidance of the sliding sleeve on the hub
- No jamming of the sliding sleeve for reliable switching processes (patent pending)
- Large gear overlap between sliding sleeve, speed hub, and hub

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Belted Drives

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Gearing

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