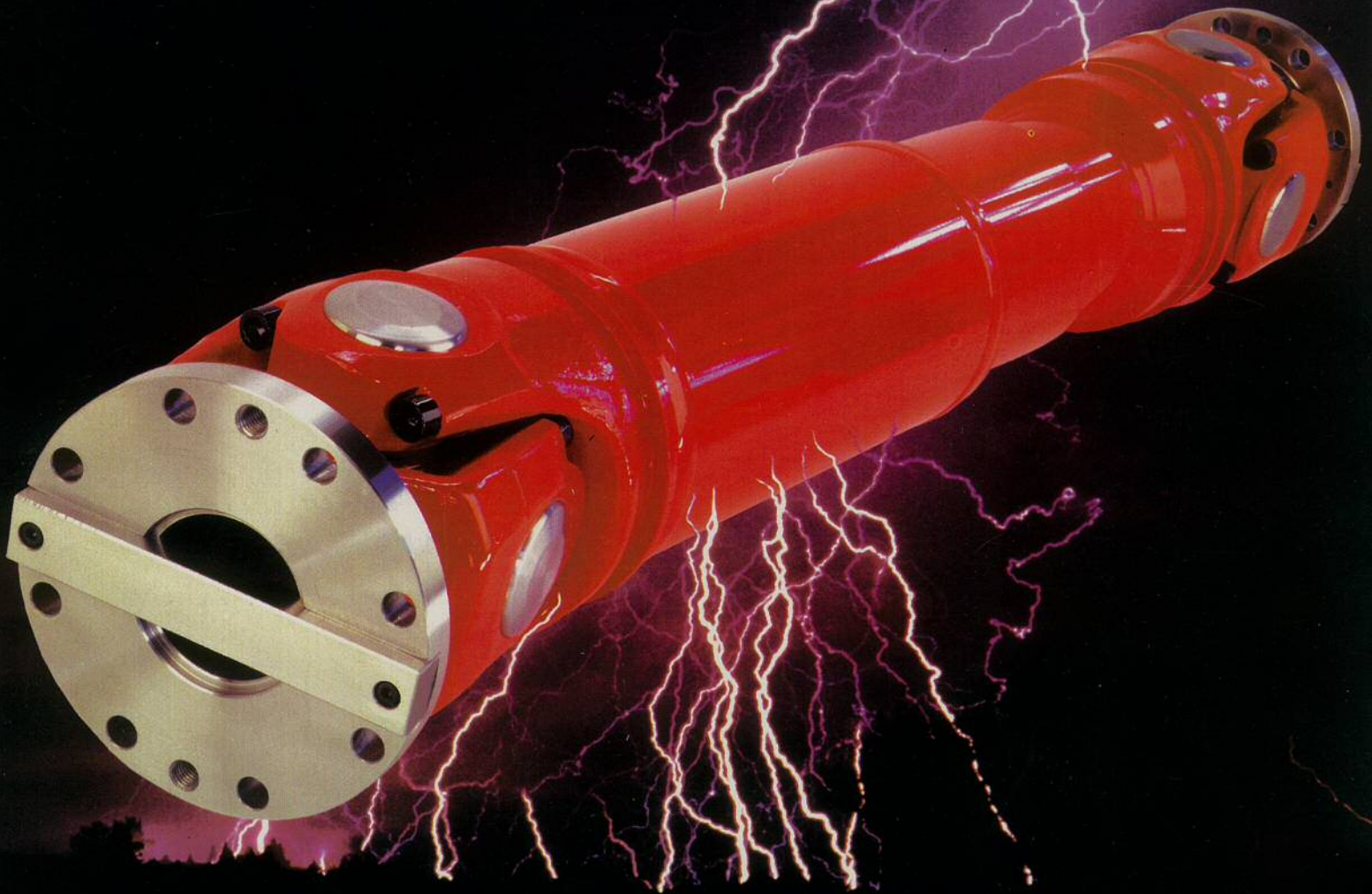




JOHNSON POWER LTD.

POWER THROUGH PERFORMANCE



HIGH PERFORMANCE INDUSTRIAL UNIVERSAL JOINTS

Introducing Johnson Power...

Combine constant product innovation with total commitment to technical support and you have **Johnson Power Ltd.** - a company in the forefront of industrial universal joint couplings for over six decades.

Johnson Power provides you access to the largest, most comprehensive line of universal joints anywhere in the world. Whatever the style, design or torque capacity, we can help you.

Universal joints are the most flexible of all couplings and the number of applications is increasing because they offer...

Ease of Installation

No painstaking alignment is required. The assembly slips into place quickly, easily and inexpensively.

Durability

Ruggedly constructed and rigorously tested, Johnson Power universal joints will provide years of service.

High Efficiency

Even at a 3 deg. angle, Johnson Power u-joints transmit power at near 100% efficiency.

Ease of Repair/Maintenance

When universal joint bearings wear, they can be replaced simply and inexpensively.

Maximum Design Freedom

With length spanning capabilities from a few inches to over fifty feet (in multiple sections), and the ability to change length under full torque load while simultaneously accommodating angular alignment changes, universal joints open your options for equipment placement and function.

Of course, to fully realize these and other benefits requires the kind of experience and dedication Johnson Power offers.

We invite you to consult with our specialists on your next project.

APPLICATIONS

With ever increasing penetration in a variety of markets, following is a partial list of applications.

**Agitators
(Mixers) Liquids & Solids
Balancing Machines
Cooling Tower Fans
Cranes
Crushers
Drill Presses
Envelope Machines
Glass Mfg.
Float Dross & Lehr Drives
Generator Sets
Hammer Mills
Lift & Carry Transfer
(Automotive Plants)
Lumber Mills
Marine Propulsion
Main Drives for River
Boats, Tug Boats,
Ferries, Bow Thrusters
Steering, Oil & Ballast
Pumps
Oil & Gas
Drilling & Workover Rigs
Fracture & Fire Pumps
Packaging
Paper Mills
Calenders Drives, Sizing, Couch
and Press Roll Drives
Plastic Mfg.
Pumping
Irrigation, Lift, Sewage, Fire Dewatering
Railway Drives
Rubber Processing
Sandpaper Machines
Shredders
Steel Mill/Metal Forming
Continuous Casting
Downcoilers, Galvanizing
Pickling, Levelling,
Straighteners, Shuttle Cars
Tube Rod & Bar Mills
Vertical Edgers
Street Sweeping Equipment
Textile Equipment
Thread Rolling
Wire Mfg.**

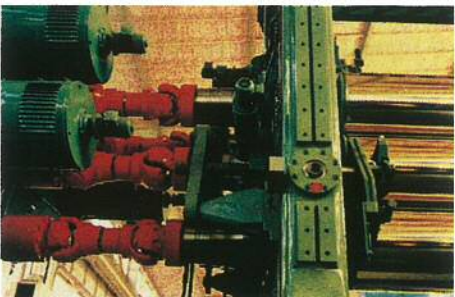
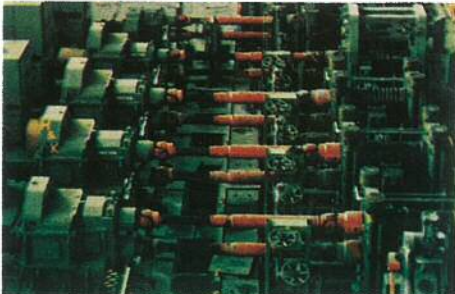


TABLE OF CONTENTS

Inside Cover	Introduction / Applications
Pg. 1	Table of Contents
Pg. 2-4	Selection Guide
Pg. 5	Operating Principles

UNIVERSAL JOINT DATA PAGES

Pg. 6-7	Johnson/Spicer Data
.....	Torque 800 to 12000 lbs-ft.
Pg. 8-9	Introduction to Johnson/GWB
Pg. 10-11	Torque 2213 to 7376 lbs-ft.
Pg. 12-13	Torque 8850 to 29502 lbs-ft.
Pg. 14-15	Torque 810 to 7738 lbs-ft.
Pg. 16-17	Torque 9581 to 19899 lbs-ft.
Pg. 18-19	Torque 18430 to 100308 lbs-ft.
Pg. 20-21	Torque 34665 to 143824 lbs-ft.
Pg. 22-23	Torque 32354 to 531045 lbs-ft.
Pg. 24-25	Torque 39828 to 165951 lbs-ft.
Pg. 26-27	Introduction to Johnson/Voith
Pg. 28-29	Torque 16963 to 202829 lbs-ft.
Pg. 30-31	Torque 33190 to 737560 lbs-ft.
Pg. 22-33	Torque 877696 to 3732053 lbs-ft.
Pg. 34-35	Wing Style Torque 600-12000 lbs-ft.
Pg. 36-37	Wing Style Torque 4250 to 26000 lbs-ft.
Pg. 38-39	Single Pin, Double Pin & Block Universal Joints
Pg. 40-41	Constant Velocity Joint Selection
Pg. 42-43	Constant Velocity Joint Data
Pg. 44-51	Companion Flange Data

DESIGN OPTIONS

Pg. 52	Quick Disconnects
Pg. 53	4-Pt. Lubrication
Pg. 54	Composite Tubing
Pg. 55-56	Installation/Maintenance
Inside Back	
Cover	Application Data Sheet
Cover	Universal Joint Benefits

Selecting a Universal Joint Drive Shaft

Johnson Power's sales/engineering staff is readily available at 708/345-4300 to assist you in your final u-joint selection.

The following data is presented as a preliminary selection overview to enhance your understanding of the appropriate procedure.

There are two major factors utilized in the selection of industrial universal joints.

1. Comparison of universal joint torque capacity vs. calculated application torque.
2. Calculating expected B-10 bearing life.

Selection Step No. 1 - Torque Requirements

A. Calculated Torque (CT):

$$\text{CT in Lbs. Ft.} = \frac{\text{HP} \times 5252}{\text{RPM}}$$

If your application is without torque overload, this calculated torque number must be less than the peak torque rating (**TS**) for the universal joint selected.

B. Equivalent Torque (ET):

$$\text{ET} = \text{Calculated Torque} \times \text{Service Factor}$$

(Table 1)

If your application exhibits torque spikes, multiply the calculated torque by the appropriate service factor found in Table 1. Typical applications are steel rolling mills, crane drives, shredders, etc.

Peak Static Torque (TS)

Maximum permissible torque for infrequently occurring torque spikes. Above this torque the bearings may brinnel their running surface. This will severely decrease the life of the universal joint.

Reversing Fatigue Torque (TR)

For reversing applications, the equivalent torque must be less than the universal joint reversing fatigue torque value listed with each u-joint series in the dimensional data pages that follow. This will insure maximum u-joint life.

Pulsating Fatigue Torque (TP)

For uni-directional applications, the equivalent torque must be less than the universal joint pulsating fatigue value (TP) to maximize universal joint life.

NOTE: Occasional torque spikes exceeding these limits (**TR & TP**) on an infrequent basis are acceptable providing they do not exceed the (TS) Peak Static Torque Value.

NOTE: The torque capacities are based on material strength. When approaching these limits, the capacity of the flange connection must be checked. This is particularly important on flanges utilizing a friction connection.

Selection Procedure continues on page 4.

Table I / Service Factors

<u>Application</u>	<u>Typical Service Factor</u>
AGITATORS	1.10 - 1.5
BLOWERS	1.10 - 1.5
BREWING & DISTILLING	1.0 - 1.25
CONVEYORS (Continuous loading)	1.25 - 1.50
(Non-Continuous loading)	1.50 - 2.00
CAR SHREDDERS	3.00 - 5.00
CRANES	2.00 - 3.00
CRUSHERS	3.00
FANS	2.00 - 3.00
FOOD INDUSTRY	1.25 - 1.75
GENERATORS (Continuous loading)	1.10 - 1.50
(Non-Continuous loading)	1.50 - 2.00
LOCOMOTIVES	2.00 - 3.00
LUMBER DRIVES	1.50 - 2.00
MACHINE TOOLS	1.50 - 2.50
MARINE TRANSMISSIONS	2.00 - 3.00
MILLS - ROTARY TYPE	2.00
MIXERS	2.00
OIL INDUSTRY	1.50 - 2.00
PUMPS	
Centrifugal	1.00
Reciprocating	2.00
PAPER MILLS	
Suction/Couch Roll Drives	2.00
Calender/Press Roll Drives	2.00 - 3.00
RUBBER INDUSTRY	1.00 - 2.50
STAMPING PRESSES	2.00 - 3.00
STEEL MILLS/METAL FORMING	
Rod and Bar Mills	1.50 - 2.00
Small Pinch Rolls	2.00 - 3.00
Small Tube Mills	2.00 - 3.00
Bending Rolls	2.00 - 3.00
Continuous Casters	2.00 - 3.00
Levelling Rolls	2.00 - 3.00
Transport Rolls	2.00 - 3.00
Continuous Roller Tables	3.00 - 6.00
Medium Section Mills	3.00 - 6.00
Heavy Tube Mills	3.00 - 6.00
Reversing Roller Tables	3.00 - 6.00
Scale Breakers	3.00 - 6.00
Straighteners	3.00 - 6.00
Cold Rolling Mills	3.00 - 6.00
Reeler Drives	3.00 - 6.00
Blooming Stands	3.00 - 6.00
Piercing Mills	3.00 - 6.00
Breast Roller Drives	6.00 -10.00
Downcoiler Drives	6.00 -10.00
Plate - shears	6.00 -10.00
Reversing Slab/blooming mills	6.00 -10.00
TEXTILE INDUSTRY	1.25 - 1.75

Table II / Speed to Angle Factors

<u>Series</u>	<u>Max Speed</u>	<u>Angle/Speed**</u>
2300,2305	6,000	26,000
2310	6,000	23,000
2315,2320	5,000	22,000
2325	4,200	22,000
2330,2335,2340,2345	4,200	20,000
2350,2355,2360	4,200	19,000
2365,2370,2375,2380,2385, 2390,2395	3,700	18,000
2200,2205,2210,2215	5,000	22,500
2220,2225,2230,2235,2240,2245	4,200	18,000
2250,2255,2260,2265,2270,2275 2290,2295	3,700	16,000
31,37,41,48,55	5,000	16,250
61,71,81	4,500	16,250
88	3,000	16,250
3110,4100,4110	4,000	12,500
3120,3130,4120,4130,3340	3,000	10,000
3220,4200	4,000	16,000
3230,4210	4,000	14,500
3140,3150,4140,4150	2,500	8,250
3240,4220	3,600	13,500
3160,4160,4170	2,000	6,000
3300	3,500	17,500
3310,4300	3,400	14,000
3320,3330,4310,4320	3,200	11,250
3250,3260,4230,4240	3,000	12,250
3350,3360,4340,4350	2,700	7,250

** Multiply Speed (RPM) x Joint Angle.
These values must be less than Angle/Speed column data.

Step No. 2 - Selection based upon bearing life.

Bearing Life Formula:

$$B-10 = \frac{1.5 \times 10^7}{\text{RPM} \times \text{Angle}} \times \left(\frac{\text{Bearing Life Factor}}{\text{Adjusted Normal Torque}} \right)^{10/3}$$

RPM - Universal Joint Operating RPM.

Angle - Operating Angle in Degrees.

The minimum angle for calculation purposes is 3 degrees.
Bearing Life Factor (BF) - Value can be found in Torque Rating Section for each u-joint series.

Adjusted Normal Torque - For smooth prime mover (i.e. AC Electric Motor) use calculated torque (CT). For gas or diesel engine drives, adjust the torque by the following factors.

Gasoline Engine (with clutch)	1.25	(without clutch)	1.75
Diesel Engine (with clutch)	1.50	(without clutch)	2.00

**Selection Step No. 3
Speed to Angle Ratio**

Due to the kinematic conditions of universal joints, the joint operating angle must be limited in relation to rotational speed.

Multiply speed (RPM) x Joint Angle

This calculation must be less than the Table II value for the selected universal joint, under all operating conditions. Each series also has a maximum permissible operating speed that must not be exceeded. Also shown in Table II.

Selection Step No. 4 - Critical Speed

All shaft assemblies have a critical speed (natural frequency). To avoid potentially damaging vibration, shafting must be designed to operate sufficiently below this critical speed. Other areas of resonance vs. natural frequency must also be avoided. Contact Johnson Power for a review.

**Selection Step No. 5
Torsional Analysis**

In certain applications (i.e. wastewater pumping) it is also necessary to analyze the system torsionally to avoid potential damaging resonance conditions. Contact Johnson Power with your application data for review.

**Further Selection Steps -
(Apply if appropriate)**

- Diameter restrictions due to equipment configuration
- Verify that u-joint series selected has angular capacity greater than maximum operating angle.
- Determine required shaft length and length compensation.
- Verify bore sizes and any special flange requirements.
- Verify correct kinematics.

Always contact Johnson Power before final selection. Phone 708/345-4300.

Operating Principles/ U-Joint Kinematics

A single universal joint operating at an angle will transmit non-uniform angular velocity.

Synchronous rotation of shaft sections is achieved by using double universal joints.

However, the two universal joints must be arranged in either configuration W or Z as illustrated. In both cases, the joint angles (β_1 & β_2) must be equal, in the same plane, and the yoke ears of the universal joint are in phase.

Using this installation method, the second joint generates non-uniform velocity equal and opposite to the 1st joint, thereby cancelling each other out and providing synchronous running speed.

Secondary Coupling Forces

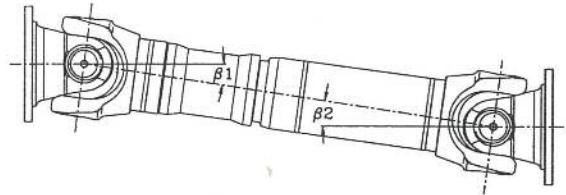
The support bearings on both the driver and driven shafts are subject to secondary coupling forces when the u-joint shaft is operating at an angle.

These forces follow a wave pattern similar to the sinusoidal non-constant velocity wave. Twice per revolution, the forces achieve a maximum and zero value.

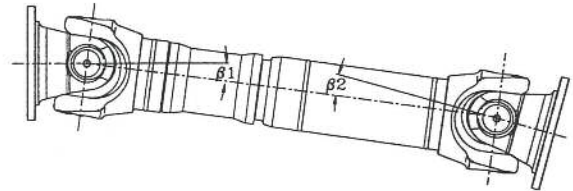
The magnitude of these forces is a function of the joint operating angle and can be minimized by reducing this angle.

Formulas to calculate these values are available from Johnson Power.

Z - ARRANGEMENT



W - ARRANGEMENT



Axial loading

Telescoping movement of the sliding spline under load results in axial forces acting on the support bearings.

These forces are a function of the spline's coefficient of friction, torque load, operating angle and spline size. The following formula can be used to approximately calculate this value.

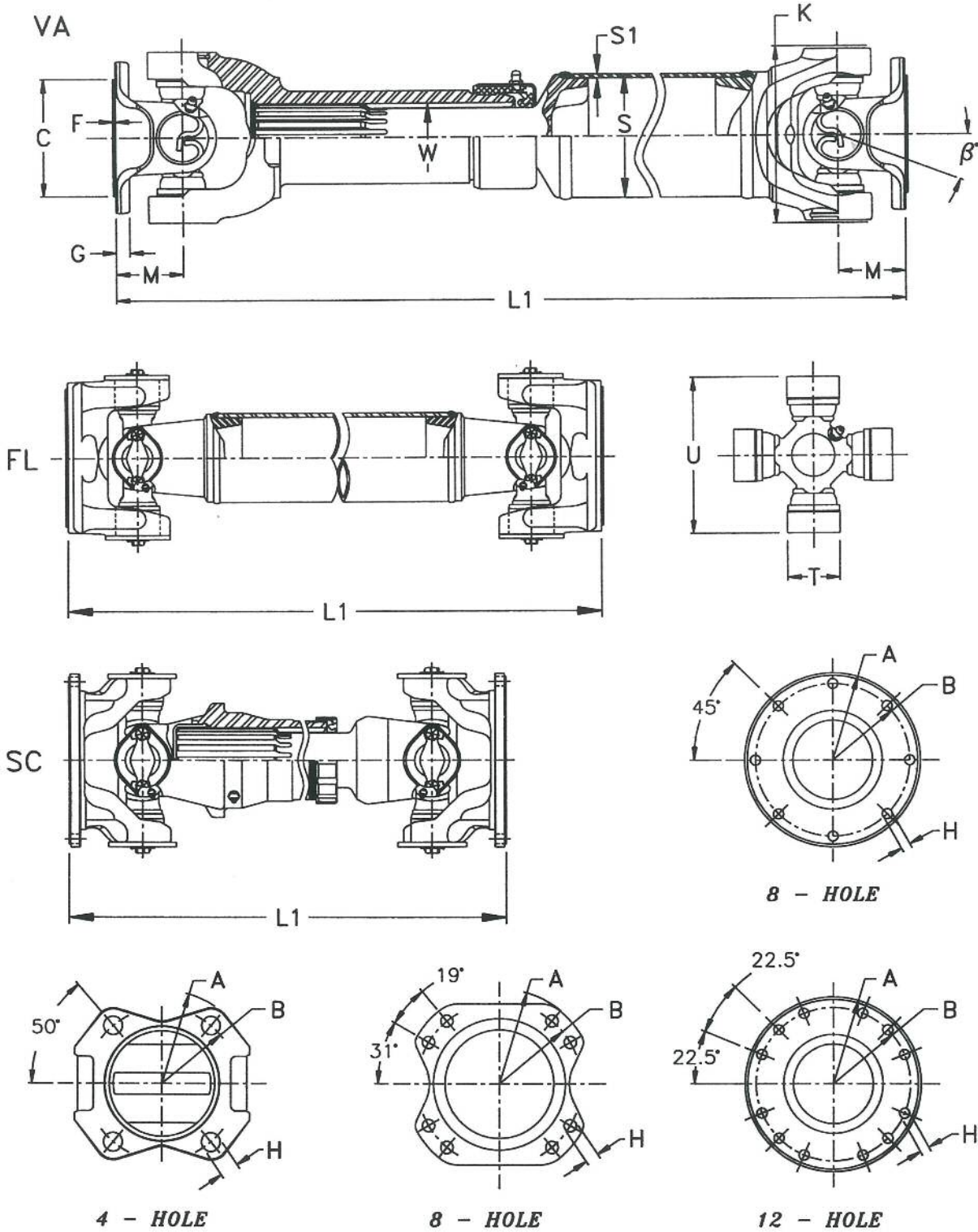
$$F_{ax} = M_d \cdot \frac{2}{d_m} \cdot \mu \cdot \cos \beta$$

M_d = Operating torque

d_m = Pitch diameter of spline

μ = Co-efficient of friction-lubricated
steel on steel 0.11 — 0.14
Rilsan on steel \approx 0.07

β = Operating angle



Series	31	37	41	48	55	61	71	81	88	91
--------	----	----	----	----	----	----	----	----	----	----

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	800	1240	1500	2000	2400	3650	4800	6500	8900	12000
BF	230	366	443	591	756	1152	1572	2187	3015	4256

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	3.88	4.56	4.56	5.88	5.88	6.88	8.00	8.00	9.63	9.63
Angle (Deg)	20	20	22	22	22	22	22	20	20	20
B	3.125	3.750	3.750	4.750	4.750	6.125	7.250	7.250	8.250	8.250
C	2.375	2.750	2.750	3.750	3.750	6.625	7.750	7.750	7.000	7.000
H	.375	.438	.438	.500	.500	.375	.375	.438	.625	.625
I	4	4	4	4	4	8	8	12	8	8
K	3.88	4.62	4.69	4.81	5.63	7.00	7.75	9.13	9.75	8.88
M	1.38	1.56	1.69	2.00	2.00	2.75	3.00	3.38	3.50	4.25
S	2.5	3.0	3.5	3.5	3.5	3.5	4.0	4.5	4.5	4.75
S1	.083	.083	.083	.083	.095	.134	.134	.134	.259	.250
T	1.063	1.188	1.188	1.375	1.375	1.875	1.937	1.937	2.186	2.933
U	3.218	3.622	4.187	4.187	4.964	5.312	6.094	7.547	8.094	8.495
W	1.38	1.50	1.50	1.56	1.75	2.00	2.50	3.00	3.00	3.16

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	13.66	14.96	15.81	15.50	15.75	22.94	22.31	24.75	25.69	30.38
	L2	3.12	3.62	3.47	2.50	2.50	4.88	3.88	3.38	3.50	2.94
FL	L1	8.32	9.25	10.12	11.13	10.88	14.0	14.56	17.67	17.75	23.69
SC	L1	8.88	9.50	9.50	8.50	9.75	9.12	10.62	13.40	13.62	21.66
	L2	1.12	.74	.74	1.00	1.00	.74	.74	1.12	1.00	1.56

I = Number of bolt holes

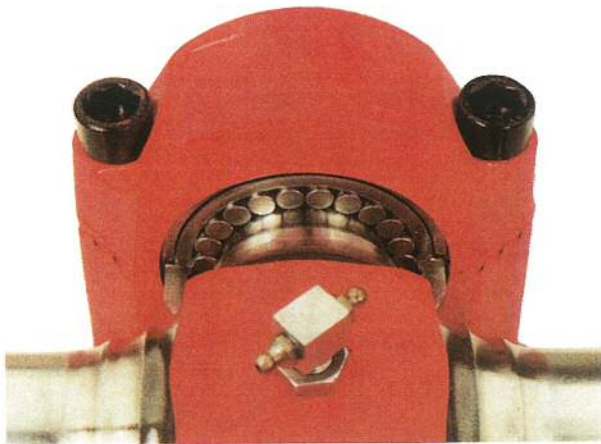
VA = Shaft with standard length compensation

FL = Fixed length shaft

SC = Short shaft with length compensation (8° Maximum angle)

1. Other designs and lengths are available - consult Johnson Power.

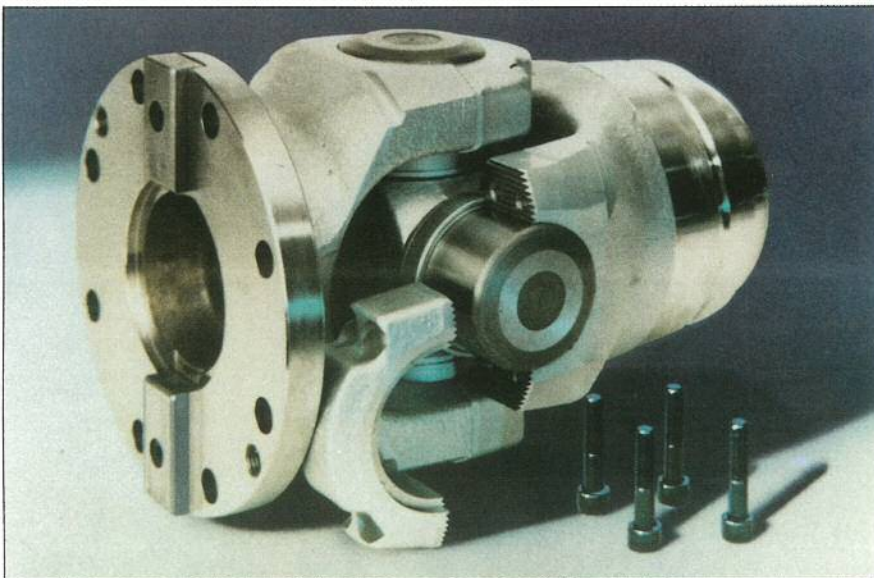
A New Generation of Compact Universal Joints



Bearing support with split yoke design

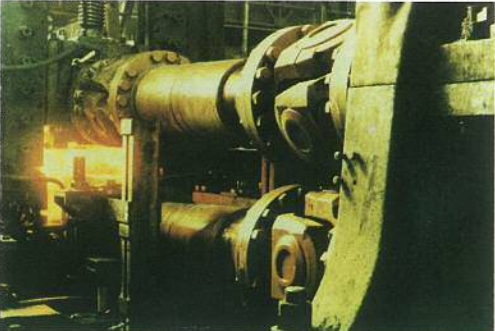
Higher Static & Dynamic Load Capacity

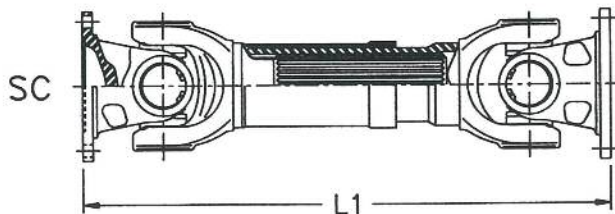
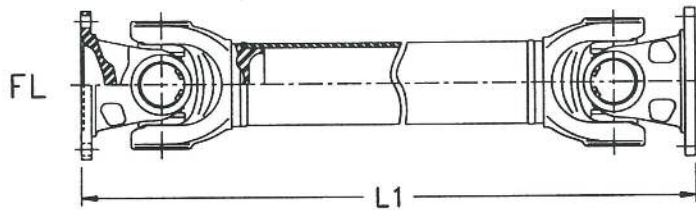
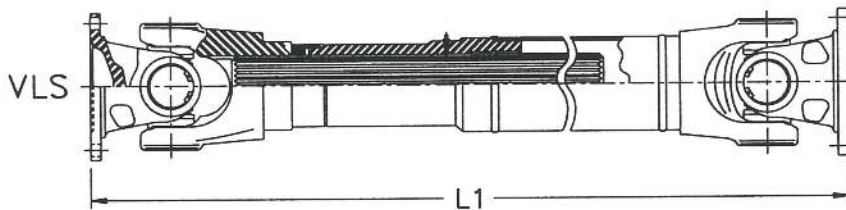
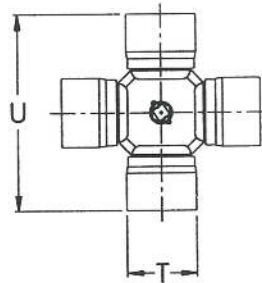
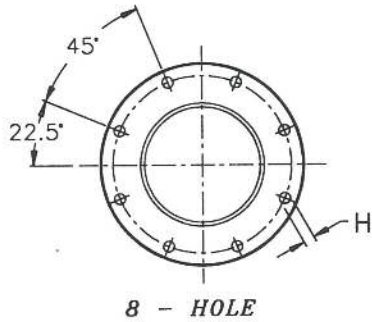
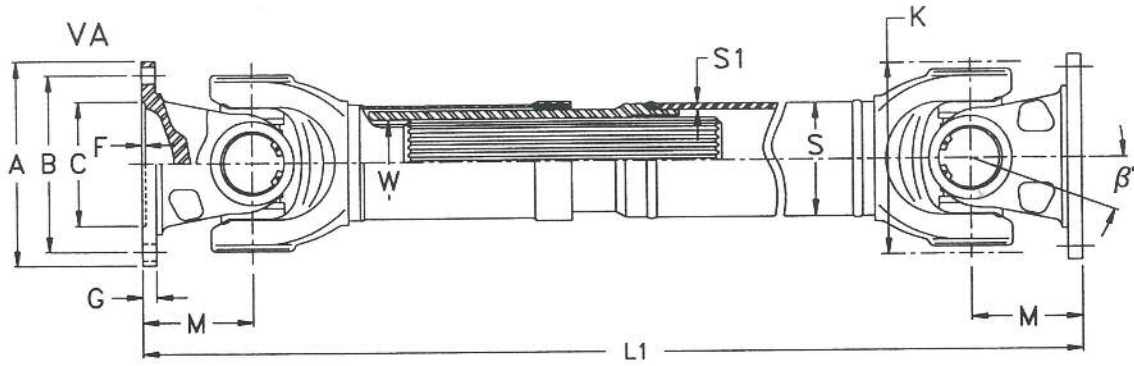
- Improved bearing support
- Optimized roller bearing design
- Oversize spline diameters



Split Cap Bearing Design

- User friendly maintenance
- Quadruple seal integrity
- Maximum bearing life





Series	2200	2205	2210	2215	2220	2225	2230	2235	2240
--------	------	------	------	------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	2213	2434	2655	3688	4425	4794	4794	7376	7376
TP	1135	1135	1859	1859	2787	2787	4130	4130	4646
TR	811	811	1328	1328	1991	1991	2950	2950	3319
BF	511	511	1069	1069	1511	1511	2106	2106	2858

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	4.72	5.91	4.72	5.91	5.91	7.09	5.91	7.09	7.09
Angle (Deg)	24	18	35	35	35	35	35	35	35
B	3.996	5.118	3.996	5.118	5.118	6.122	5.118	6.122	6.122
C	2.953	3.543	2.952	3.543	3.543	4.331	3.543	4.331	4.331
F	.098	.118	.098	.118	.118	.118	.118	.118	.118
G	.315	.354	.315	.354	.394	.472	.394	.472	.472
H	.398	.476	.398	.476	.476	.555	.476	.555	.555
I	8	8	8	8	8	8	8	8	8
K	4.56	4.56	5.00	5.00	5.55	5.55	6.22	6.22	6.69
M	2.51	2.20	2.95	3.14	3.38	3.38	3.54	3.54	3.93
S	2.750	2.750	3.250	3.250	3.375	3.375	3.625	3.625	4.000
S1	.125	.125	.188	.188	.250	.250	.313	.313	.260
T	1.378	1.378	1.653	1.653	1.890	1.890	2.047	2.047	2.244
U	3.811	3.811	4.114	4.114	4.586	4.586	5.236	5.236	5.669
W	1.77	1.77	2.05	2.05	2.17	2.17	2.56	2.56	2.95

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	19.68	19.09	22.83	23.22	24.40	24.40	25.98	25.98	27.95
	L2	4.72	4.72	4.33	4.33	4.33	4.33	4.33	4.33	4.33
VLS	L1			38.18		39.76		41.33		
	L2			19.68		19.68		19.68		
FL		12.59	12.00	14.56	14.96	15.35	15.35	16.53	16.53	18.11
SC	L1	15.74	15.15	15.74	16.14	17.51	17.51	18.50	18.50	20.08
	L2	2.56	2.56	1.37	1.37	1.37	1.37	1.57	1.57	1.57

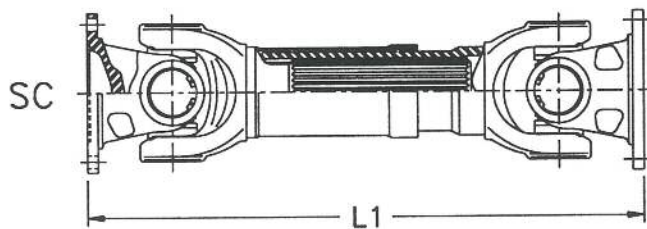
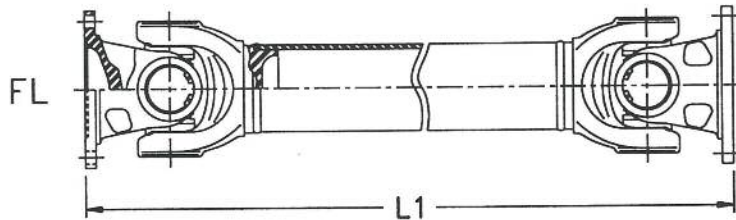
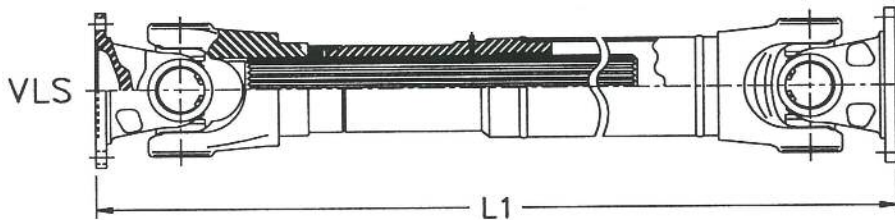
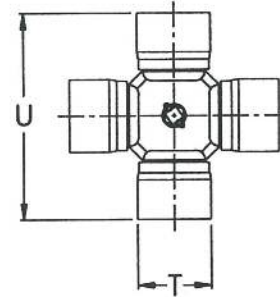
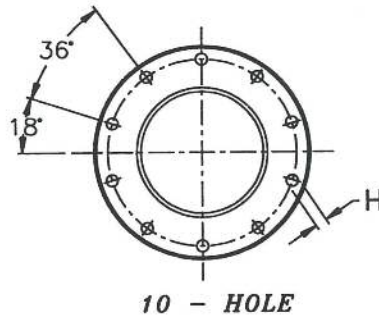
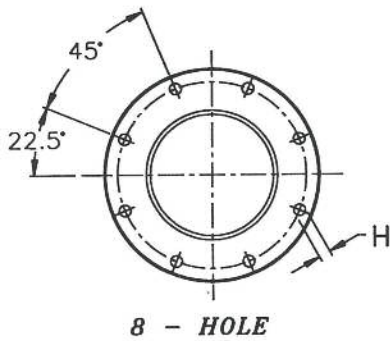
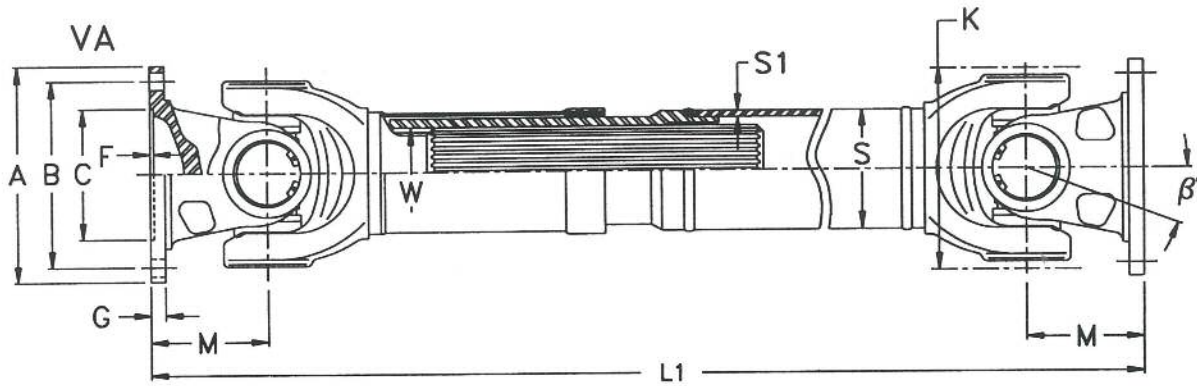
VA = Shaft with standard length compensation

VLS = Shaft with long length compensation

FL = Fixed length shaft

SC = Short shaft with length compensation

1. Other designs and lengths are available - consult Johnson Power.



Series	2245	2250	2255	2260	2265	2270	2275	2290	2295
--------	------	------	------	------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	8850	11063	11800	11800	13276	24321	24321	29502	29502
TP	4646	6711	6711	7951	7951	13413	13413	18572	18572
TR	3319	4794	4794	5679	5679	9581	9581	13266	13266
BF	2858	3069	3069	4918	4918	6144	6144	9515	9515

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

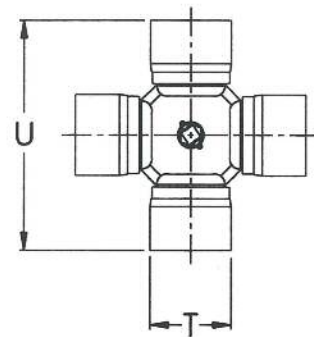
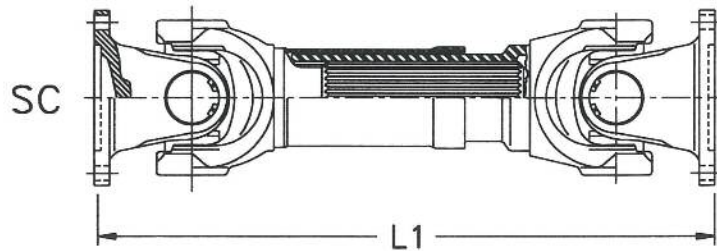
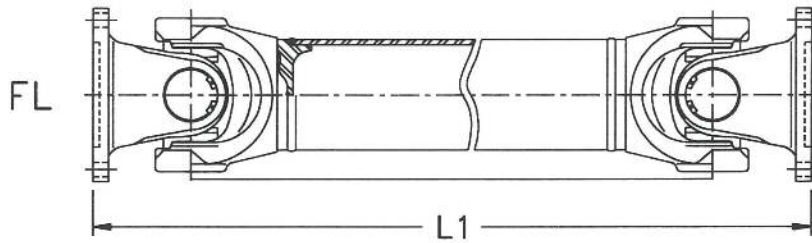
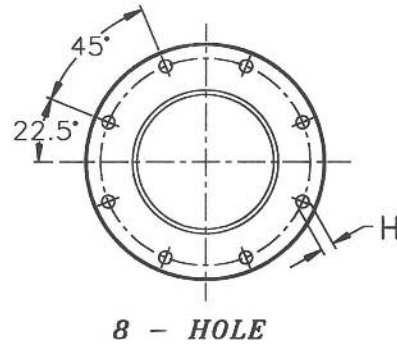
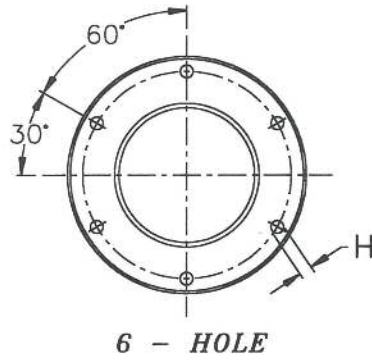
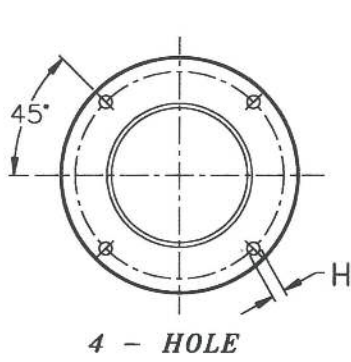
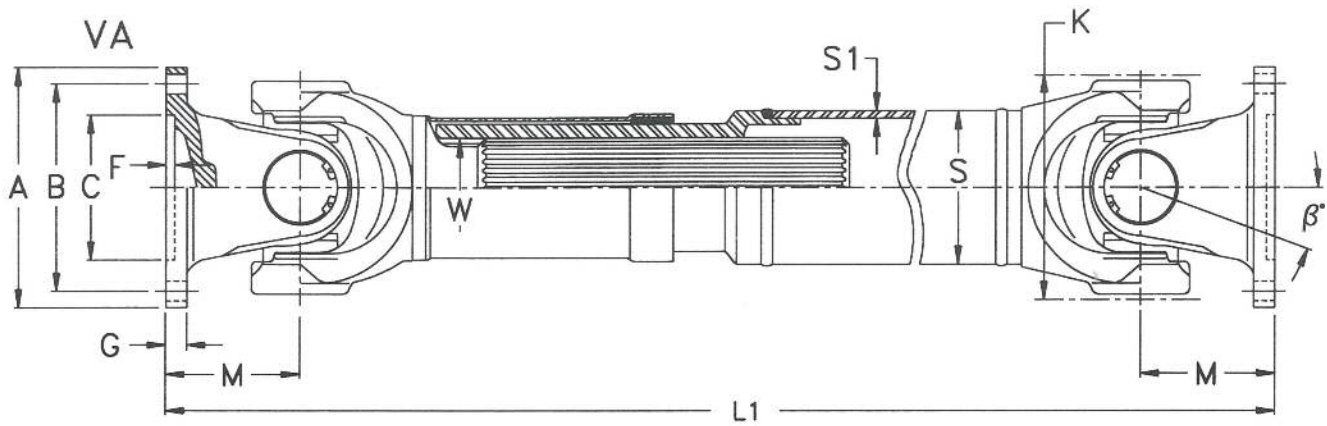
A	8.86	7.09	8.86	7.09	8.86	8.86	9.84	9.84	11.22
Angle (Deg)	24	24	24	30	30	24	24	20	20
B	7.716	6.122	7.716	6.122	7.716	7.716	8.583	8.583	9.646
C	5.512	4.331	5.512	4.331	5.512	5.512	5.512	5.512	6.890
F	.197	.118	.197	.118	.197	.197	.236	.314	.236
G	.591	.551	.59	.59	.59	.59	.708	.708	.788
H	.634	.634	.634	.634	.634	.634	.712	.712	.791
I	8	10	8	10	8	8	8	8	8
K	6.69	7.00	7.00	8.03	8.03	8.46	8.46	9.84	9.84
M	3.34	3.74	3.74	4.33	4.33	4.25	4.25	4.92	4.92
S	4.000	4.375	4.375	5.500	5.500	5.625	5.625	6.625	6.625
S1	.260	.313	.313	.250	.250	.313	.313	.313	.313
T	2.244	2.244	2.244	2.559	2.559	2.835	2.835	2.913	2.913
U	5.669	5.987	5.987	6.772	6.772	7.283	7.283	8.543	8.543
W	2.95	3.15	3.15	3.54	3.54	3.54	3.54	4.53	4.53

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	26.77	30.11	30.11	31.49	31.49	31.49	31.49	33.07	33.07
	L2	4.33	4.33	4.33	5.51	5.51	4.33	4.33	3.93	3.93
VLS	L1	46.85	37.79	Consult Johnson Power						
	L2	19.68	7.87							
FL	L1	16.92	18.89	18.89	19.29	19.29	21.25	21.25	24.01	24.01
SC	L1	18.89	25.59	25.59	28.74	28.74	21.65	21.65	28.35	28.35
	L2	1.37	3.15	3.15	5.51	5.51	1.57	1.57	2.56	2.56

VA = Shaft with standard length compensation
 VLS = Shaft with long length compensation
 FL = Fixed length shaft
 SC = Short shaft with length compensation

1. Other designs and lengths are available - consult Johnson Power.



Series	2300	2305	2310	2315	2320	2325	2330	2335	2340	2345
--------	------	------	------	------	------	------	------	------	------	------

TORQUE RATINGS

TS	810	1326	1989	2800	3685	5674	7738	7738	7738	7738
TP	412	722	1031	1650	1960	2992	4538	4538	4538	4538
TR	294	515	737	1179	1400	2137	3242	3242	3242	3242
BF	389	389	543	774	870	1401	2006	2006	2006	2006

DIMENSIONAL DATA

A	3.54	3.94	4.72	5.91	5.91	5.91	5.91	5.91	7.09	7.09
Angle (Deg)	35	25	25	25	25	25	25	44	25	44
B	2.933	3.307	3.996	5.118	5.118	5.118	5.118	5.118	6.122	6.122
C	1.850	2.244	2.953	3.543	3.543	3.543	3.543	3.543	4.331	4.331
F	.098	.098	.098	.118	.118	.118	.118	.118	.118	.118
G	.236	.276	.315	.394	.394	.394	.394	.394	.472	.472
H	.325	.325	.404	.482	.482	.476	.476	.476	.555	.555
I	4	6	8	8	8	8	8	8	8	8
K	3.54	3.54	3.86	4.45	5.00	5.59	6.22	6.22	6.22	6.22
M	1.97	1.89	2.13	2.36	3.07	3.74	4.02	4.02	4.02	4.02
S	2.125	2.500	3.000	3.500	3.500	4.000	4.750	4.000	4.750	4.000
S1	.188	.095	.095	.095	.125	.156	.125	.250	.125	.250
T	1.063	1.063	1.189	1.374	1.374	1.654	1.874	1.874	1.874	1.874
U	2.933	2.933	3.220	3.622	4.190	4.701	5.322	5.322	5.322	5.322
W	1.42	1.42	1.57	1.77	1.89	2.13	2.44	2.44	2.44	2.44

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

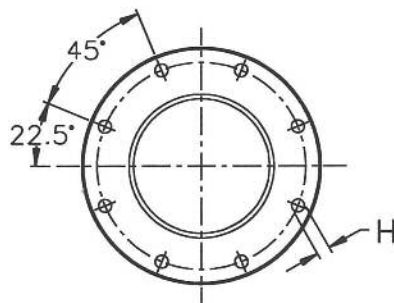
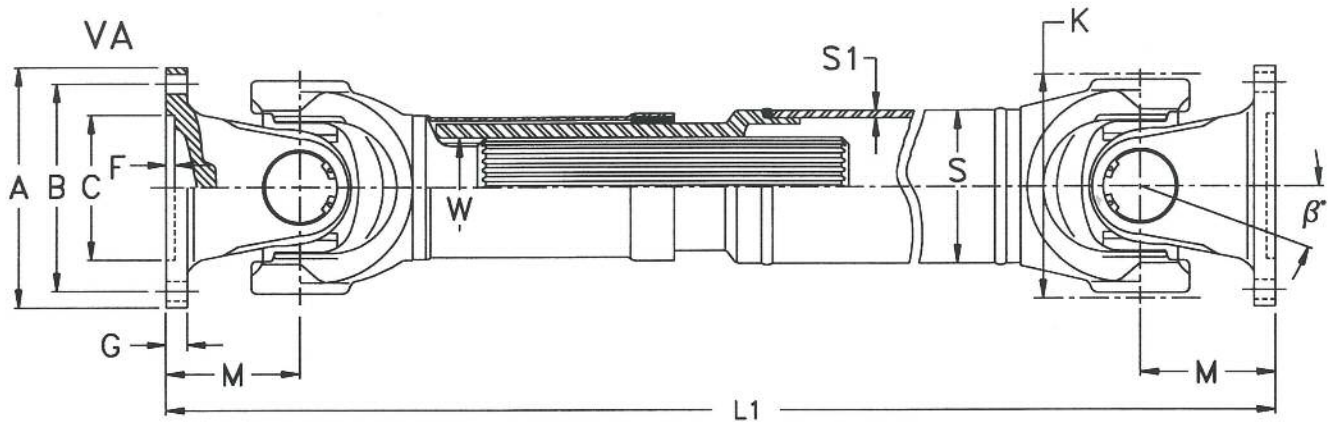
VA	L1	14.13	13.62	14.92	17.24	19.84	22.91	23.07	27.28	23.07	27.28
	L2	2.36	2.36	2.76	3.94	4.33	4.33	4.33	7.09	4.33	7.09
SC	L1	9.80	12.20	13.35	14.29	16.26	20.18	18.90	22.64	18.90	22.64
	L2	.98	1.93	2.17	2.17	2.17	2.76	1.77	4.33	1.77	4.33
FL	L1	9.09	8.70	9.41	10.31	12.68	14.92	16.65	17.68	16.65	17.68

VA = Shaft with standard length compensation

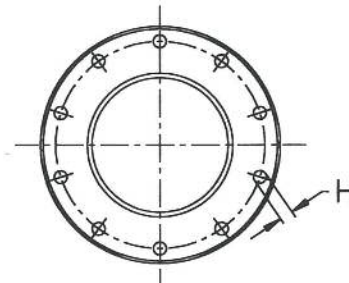
SC = Short shaft with length compensation

FL = Fixed length shaft

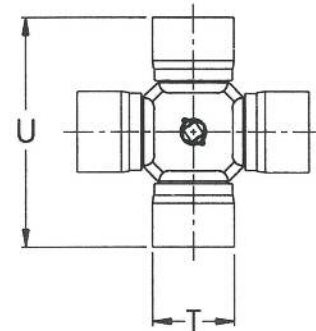
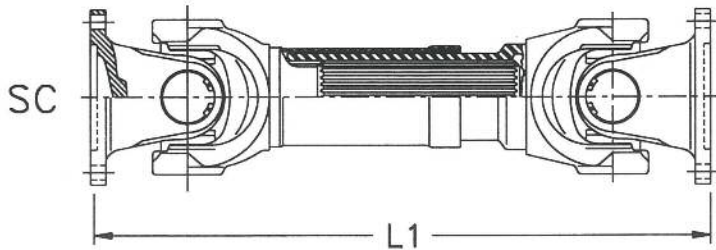
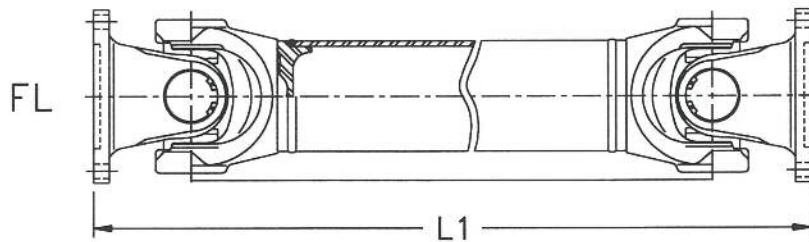
1. Other designs and lengths are available-consult Johnson Power.



8 - HOLE



10 - HOLE



Series	2350	2355	2360	2365	2370	2375	2380	2385	2390	2395
--------	------	------	------	------	------	------	------	------	------	------

TORQUE RATINGS

TS	9581	9581	9581	14014	14014	14014	16951	16951	19899	19899
TP	5262	5262	5262	7532	7532	7532	9286	9286	11349	11349
TR	3758	3758	3758	5380	5380	5380	6633	6633	8107	8107
BF	2633	2633	2633	3363	3363	3363	3916	3916	4920	4920

DIMENSIONAL DATA

A	7.09	7.09	8.86	7.09	7.09	8.86	7.09	8.86	7.09	8.86
Angle (Deg)	25	35	25	25	35	25	25	25	25	25
B	6.122	6.122	7.717	6.122	6.122	7.717	6.122	7.717	6.122	7.717
C	4.331	4.331	5.512	4.331	4.331	5.512	4.331	5.512	4.331	5.512
F	.118	.118	.197	.118	.118	.197	.118	.197	.118	.197
G	.472	.472	.591	.551	.551	.591	.551	.591	.591	.591
H	.555	.555	.634	.634	.634	.634	.634	.634	.634	.634
I	8	8	8	10	10	8	10	8	10	8
K	6.77	6.77	6.77	7.01	7.01	7.01	7.64	7.64	8.03	8.03
M	3.74	3.74	3.74	4.53	4.53	3.74	4.53	4.53	4.33	4.33
S	4.750	4.375	4.750	4.750	4.750	4.750	5.125	5.125	5.625	5.625
S1	.188	.250	.188	.250	.250	.250	.313	.313	.313	.313
T	2.047	2.047	2.047	2.244	2.244	2.244	2.323	2.323	2.559	2.559
U	5.795	5.795	5.795	5.984	5.984	5.984	6.602	6.602	6.772	6.772
W	2.68	2.68	2.68	3.07	3.07	3.07	3.23	3.23	3.46	3.46

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

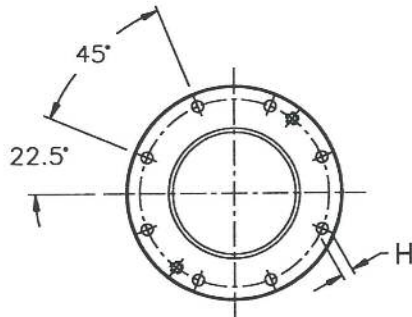
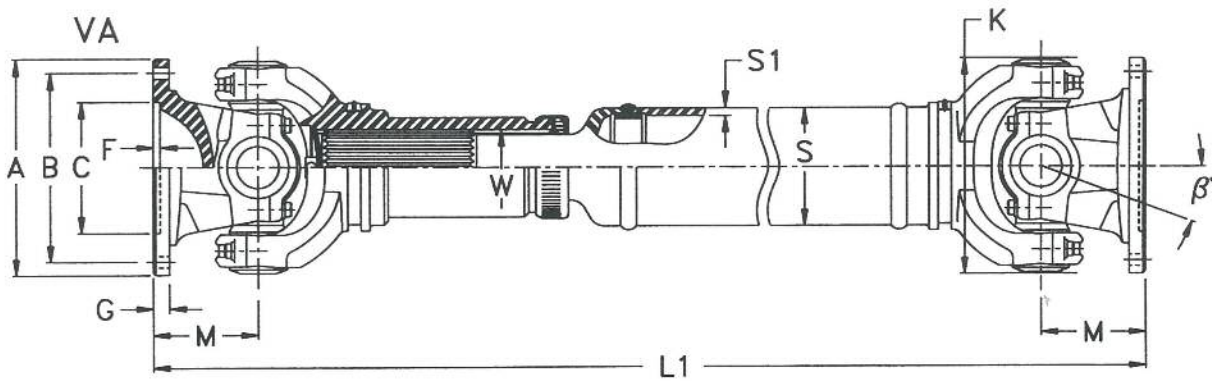
VA	L1	23.43	27.68	23.43	26.06	26.81	24.49	26.18	26.18	27.01	27.01
	L2	4.33	7.09	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
SC	L1	17.20	23.15	17.20	19.80	23.86	18.23	23.23	23.23	24.06	24.06
	L2	1.57	4.33	1.57	1.97	4.33	1.97	3.15	3.15	3.15	3.15
FL	L1	16.73	16.73	16.73	18.70	19.49	17.13	19.09	19.09	19.33	19.33

VA = Shaft with standard length compensation

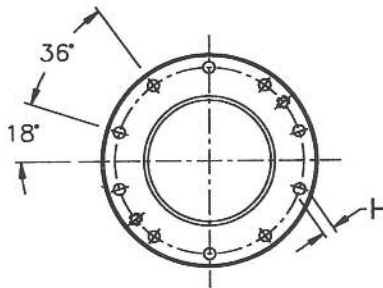
SC = Short shaft with length compensation

FL = Fixed length shaft

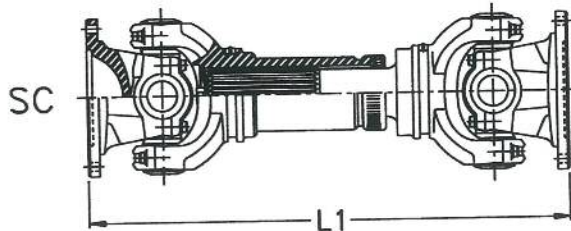
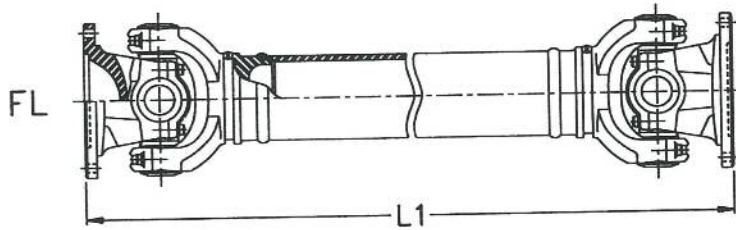
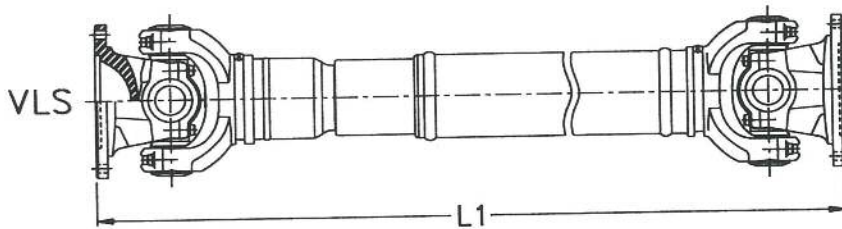
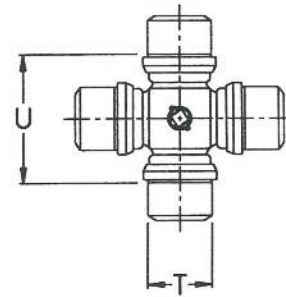
1. Other designs and lengths are available-consult Johnson Power.



8 - HOLE



10 - HOLE



Series	3110	3120	3130	3140	3150	3160
--------	------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	18439	27289	38353	53104	69330	100308
TP	11358	17553	25814	37173	73313	107388
TR	8113	12538	18439	26552	52366	76706
BF	9302	13864	19560	27350	36599	49620

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	9.84	11.22	12.40	13.78	15.35	17.13
Angle (Deg)	15	15	15	15	15	15
B	8.583	9.646	11.024	12.205	13.583	15.157
C	5.512	6.890	6.890	8.661	9.843	11.024
F	.236	.276	.276	.315	.315	.394
G	.709	.787	.866	.984	1.102	1.260
H	.713	.791	.870	.870	.949	1.067
I	8	8	8	10	10	10
K	9.84	11.22	12.40	13.78	15.35	17.13
M	5.11	5.31	5.90	6.69	7.48	8.26
S	5.625	6.500	7.750	8.750	10.000	11.000
S1	.313	.375	.375	.500	1.000	1.000
T	2.913	3.268	3.740	4.331	4.724	5.118
U	6.063	6.890	7.480	8.268	9.252	10.315
W	3.94	3.94	5.12	5.91	6.69	6.69

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	37.79	40.55	48.03	53.54	58.66	63.78
	L2	3.54	3.93	4.72	5.31	5.90	6.69
VLS	L1	45.27	48.03	53.93	59.44	64.96	70.86
	L2	8.46	8.85	9.84	11.02	12.20	12.59
FL	L1	26.18	27.95	31.10	35.24	38.39	41.73
SC	L1	27.95	28.93	34.64	38.58	42.12	47.24
	L2	1.57	2.36	3.34	2.75	2.95	3.54

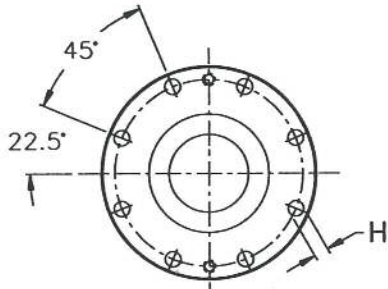
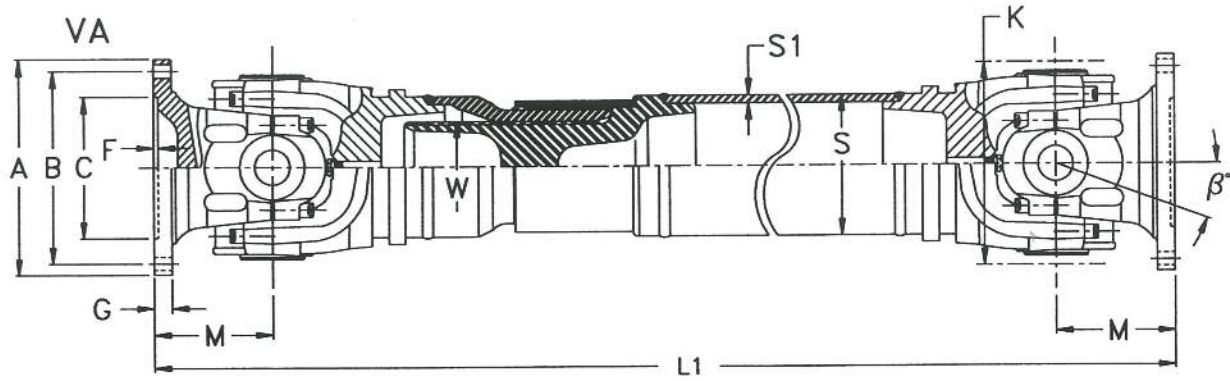
VA = Shaft with standard length compensation

VLS = Shaft with long length compensation

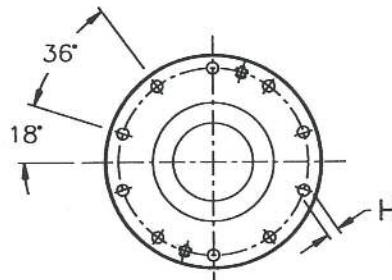
FL = Fixed length shaft

SC = Short shaft with length compensation

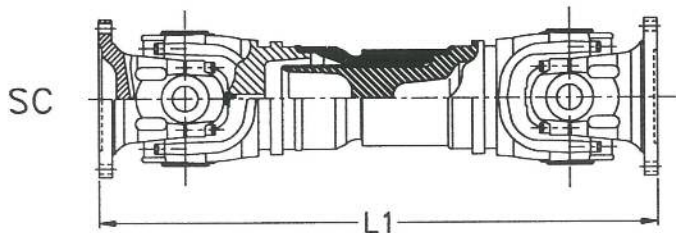
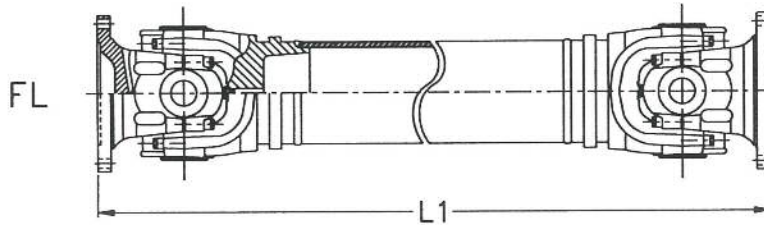
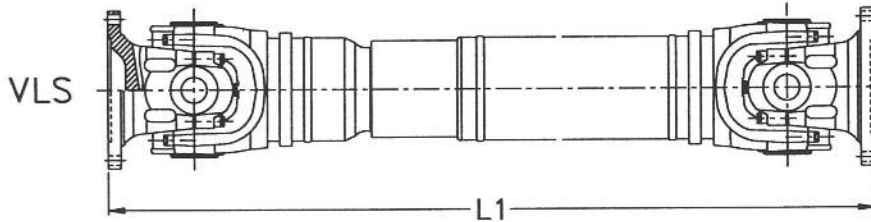
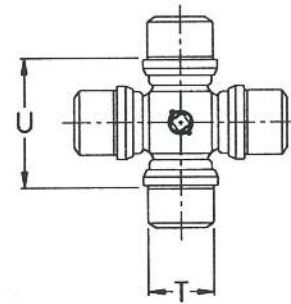
1. Other designs and lengths are available - consult Johnson Power.



8 - HOLE



10 - HOLE



Series	3220	3230	3240	3250	3260
--------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	34665	51629	75231	106946	143824
TP	23749	37173	54727	77444	105324
TR	16964	26552	39091	55317	75231
BF	13592	18572	26788	35667	47115

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	11.22	12.40	13.78	15.35	17.13
Angle (Deg)	15	15	15	15	15
B	9.646	11.024	12.205	13.583	15.157
C	6.890	6.890	8.661	9.843	11.024
F	.276	.276	.315	.315	.394
G	.787	.866	.984	1.102	1.260
H	.791	.870	.870	.949	1.067
I	8	8	10	10	10
K	9.44	10.43	11.81	12.99	14.56
M	5.32	5.91	6.69	7.48	8.27
S	6.750	8.750	8.750	11.000	11.000
S1	.500	.50	.625	.750	.750
T	3.268	3.740	4.331	4.724	5.118
U	5.079	5.472	6.299	6.929	7.717
W	4.53	5.91	5.91	7.28	7.28

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	34.25	38.58	42.12	47.63	50.39
	L2	3.93	5.31	5.31	6.69	6.69
VLS	L1	38.98	42.52	46.07	50.98	53.74
	L2	7.87	8.66	8.66	9.84	9.84
FL	L1	25.197	27.953	31.496	35.039	37.795
SC	L1	29.52	32.87	36.41	40.55	43.30
	L2	1.96	2.36	2.36	3.15	3.15

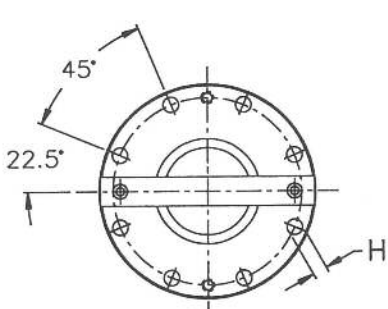
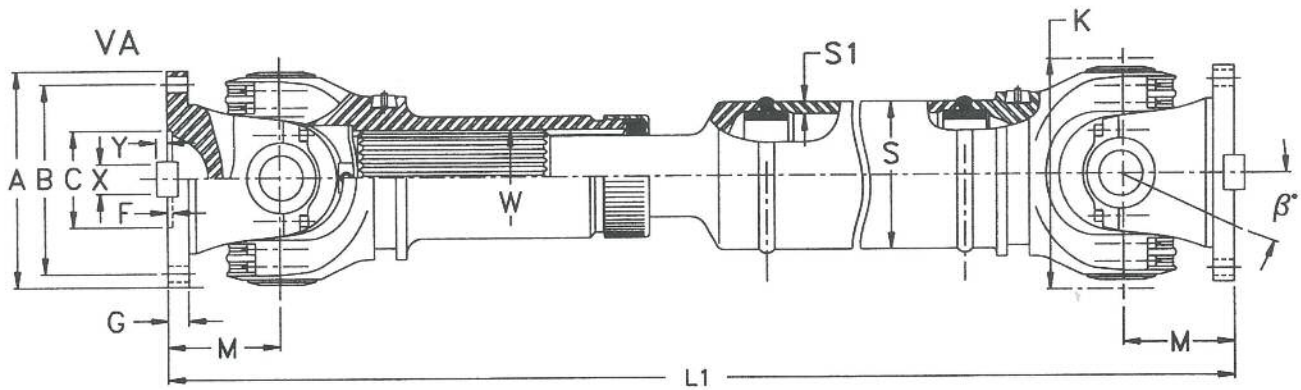
VA = Shaft with standard length compensation

VLS = Shaft with long length compensation

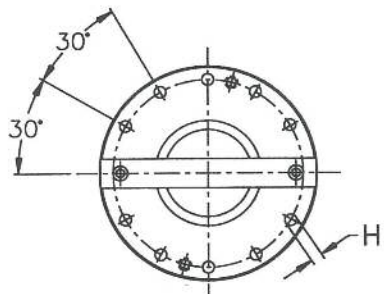
FL = Fixed length shaft

SC = Short shaft with length compensation

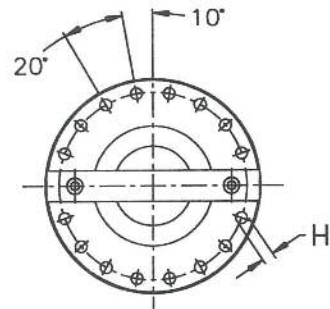
1. Other designs and lengths are available - consult Johnson Power.



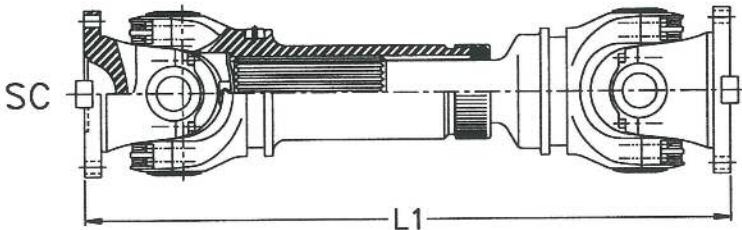
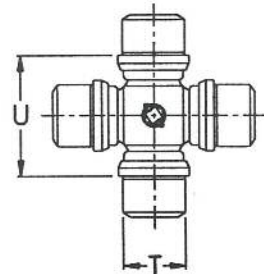
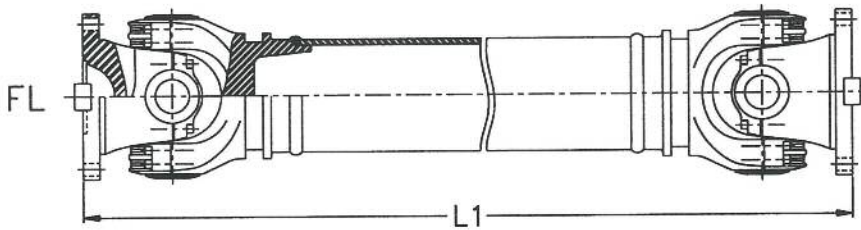
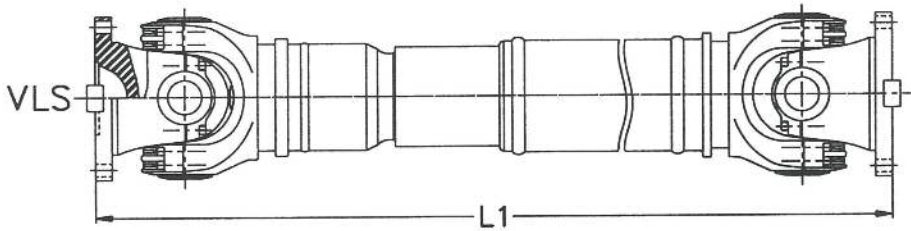
8 - HOLE



10 - HOLE



16 - HOLE



Series	4100	4110	4120	4130	4140	4150	4160	4170	4180
--------	------	------	------	------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	32453	47204	72281	103259	140137	199141	302400	405658	597424
TP	23749	29945	46466	68151	97063	144562	227168	263309	402708
TR	16964	21389	33190	48679	69331	103258	162263	188078	287648
BF	8797	12380	18241	25212	33443	44706	63513	81948	124709

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	8.86	9.84	11.22	12.40	13.78	15.35	17.13	18.90	21.65
Angle (Deg)	10	10	10	10	10	10	10	10	10
B	7.717	8.583	9.646	11.024	12.205	13.583	15.157	16.732	19.370
C	4.134	4.134	4.921	5.118	6.102	6.693	7.480	8.071	9.843
F	.197	.236	.276	.315	.315	.315	.394	.472	.472
G	.787	.984	1.063	1.260	1.378	1.575	1.654	1.850	1.969
H	.669	.748	.827	.905	.905	.984	1.102	1.220	1.220
I	8	8	8	10	10	10	16	16	16
K	8.86	9.84	11.22	12.40	13.78	15.35	17.13	18.90	21.65
M	5.11	5.31	5.90	6.69	7.28	8.07	9.25	10.43	11.41
S	6.250	6.750	8.000	9.000	10.000	10.750	12.500	14.000	16.000
S1	.875	.875	1.000	1.000	1.250	1.500	1.500	1.500	2.000
T	2.913	3.268	3.740	4.331	4.724	5.118	6.063	6.693	7.677
U	5.079	5.472	6.299	6.929	7.717	8.504	9.842	10.866	12.402
W	3.94	4.53	5.12	5.91	6.69	7.28	8.27	8.27	9.45
X	1.260	1.575	1.575	1.575	1.968	2.756	3.150	3.543	3.937
Y	.354	.492	.590	.590	.630	.709	.787	.886	.886

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	37.99	40.74	46.45	54.13	58.46	64.56	70.66	79.13	86.02
	L2	3.34	3.54	4.72	5.31	5.90	6.29	6.69	7.48	8.26
VLS	L1	45.27	47.63	53.93	59.44	64.56	73.22	77.95	85.82	91.73
	L2	8.26	8.66	9.44	10.63	11.41	12.40	13.18	13.78	14.17
FL	L1	26.18	27.95	31.10	35.23	37.99	42.91	47.63	52.75	58.66
SC	L1	27.95	30.31	34.64	38.58	42.12	47.24	51.18	59.84	66.14
	L2	1.57	1.57	2.36	2.36	2.75	2.75	2.75	3.15	3.15

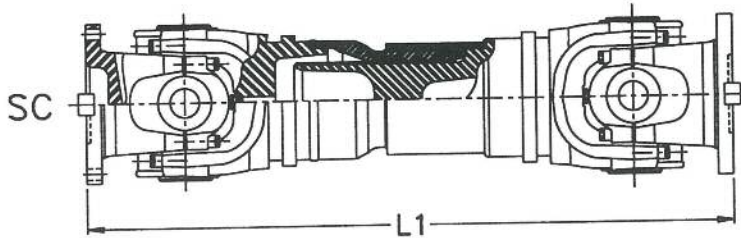
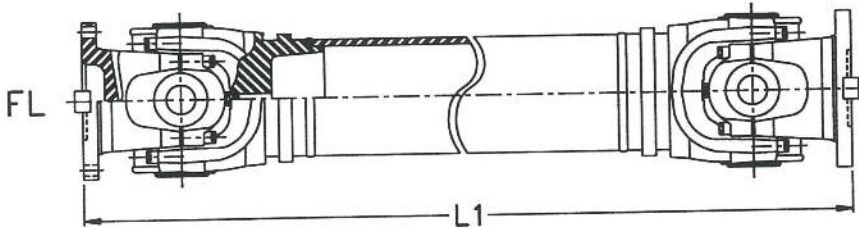
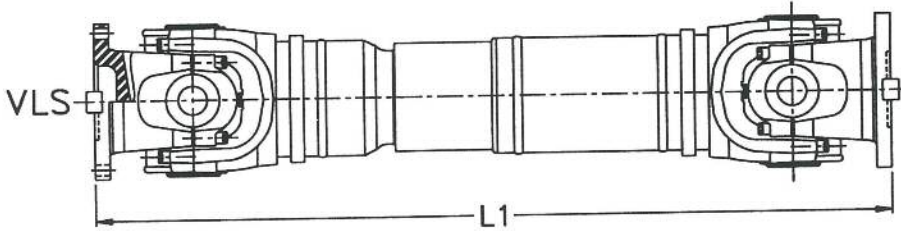
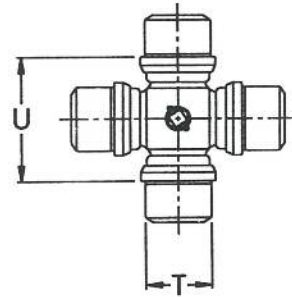
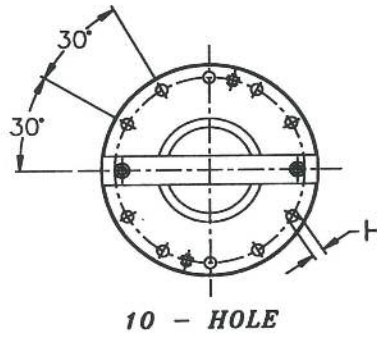
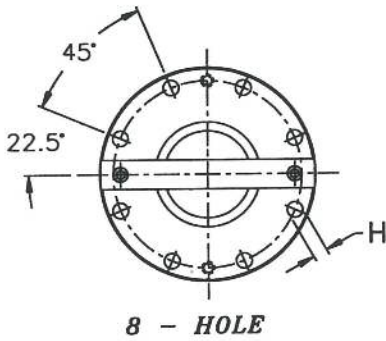
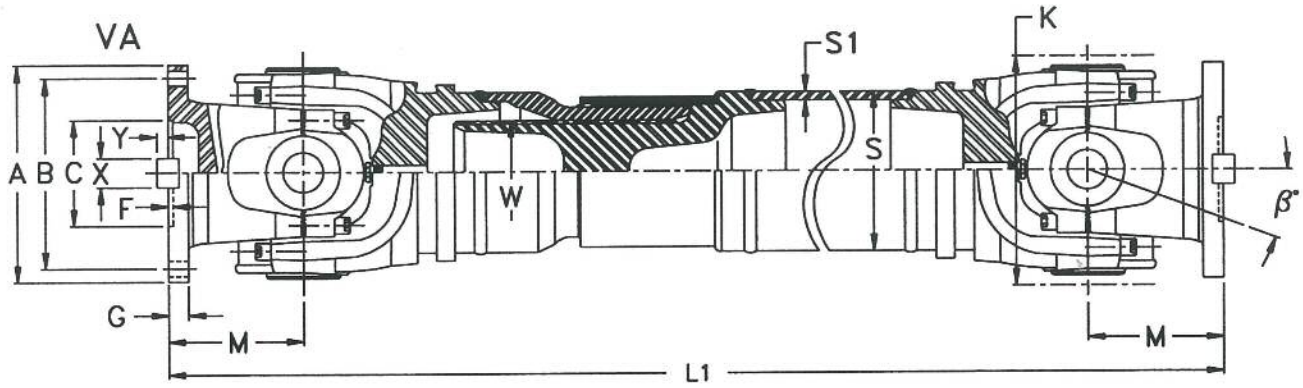
VA = Shaft with standard length compensation

VLS = Shaft with long length compensation

FL = Fixed length shaft

SC = Short shaft with length compensation

1. Other designs and lengths are available - consult Johnson Power.



Series	4200	4210	4220	4230	4240
--------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	39828	59005	86295	121697	165951
TP	23749	37173	54727	77444	105324
TR	16964	26552	39091	55317	75231
BF	9533	13658	19501	27540	36770

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	8.86	9.84	11.22	12.40	13.78
Angle (Deg)	15	15	15	15	15
B	7.716	8.583	9.646	11.024	12.205
C	4.134	4.134	4.921	5.118	6.102
F	.276	.295	.335	.374	.374
G	.787	.984	1.063	1.260	1.378
H	.669	.748	.827	.905	.905
I	8	8	8	10	10
K	8.86	9.84	11.22	12.40	13.78
M	5.71	6.50	7.09	8.07	8.86
S	6.750	8.750	8.750	10.750	10.750
S1	.500	.500	.625	.750	.750
T	2.913	3.268	3.740	4.331	4.724
U	5.079	5.472	6.299	6.929	7.716
W	4.53	5.91	5.91	7.28	7.28
X	1.260	1.575	1.575	1.575	1.968
Y	.354	.492	.591	.591	.630

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	35.04	39.76	42.91	48.82	51.58
	L2	3.94	5.31	5.31	6.69	6.69
VLS	L1	39.76	43.70	46.85	52.17	54.92
	L2	7.87	8.66	8.66	9.84	9.84
FL	L1	26.38	29.53	33.07	36.61	39.37
SC	L1	30.32	34.06	37.21	41.73	44.49
	L2	1.97	2.36	2.36	3.15	3.15

VA = Shaft with standard length compensation

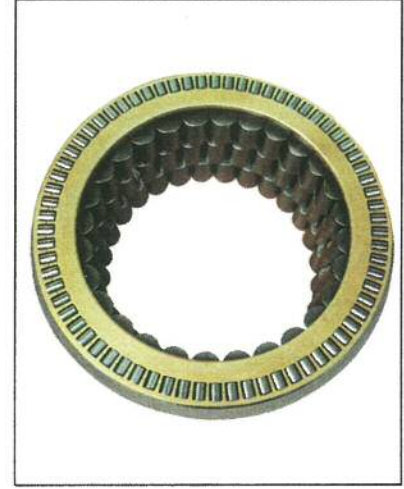
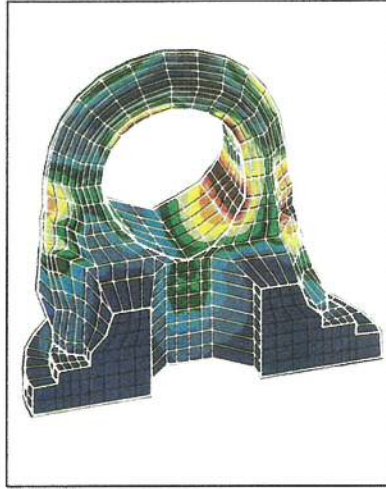
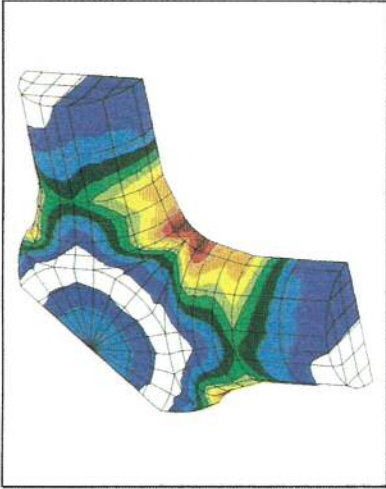
VLS = Shaft with long length compensation

FL = Fixed length shaft

SC = Short shaft with length compensation

1. Other designs and lengths are available - consult Johnson Power.

The Newest Technology in High Performance Universal Joints



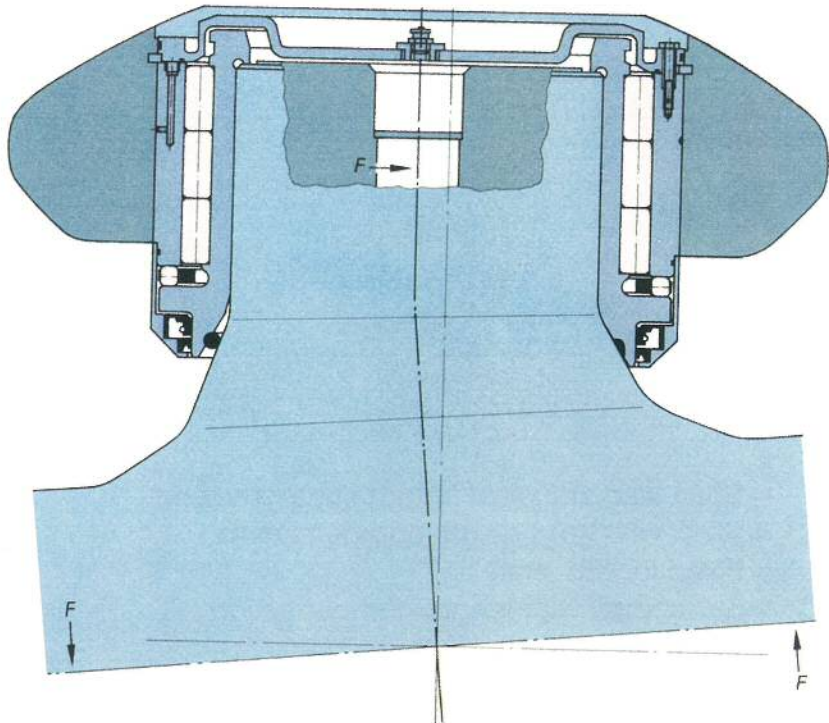
Bearing Cartridge Design

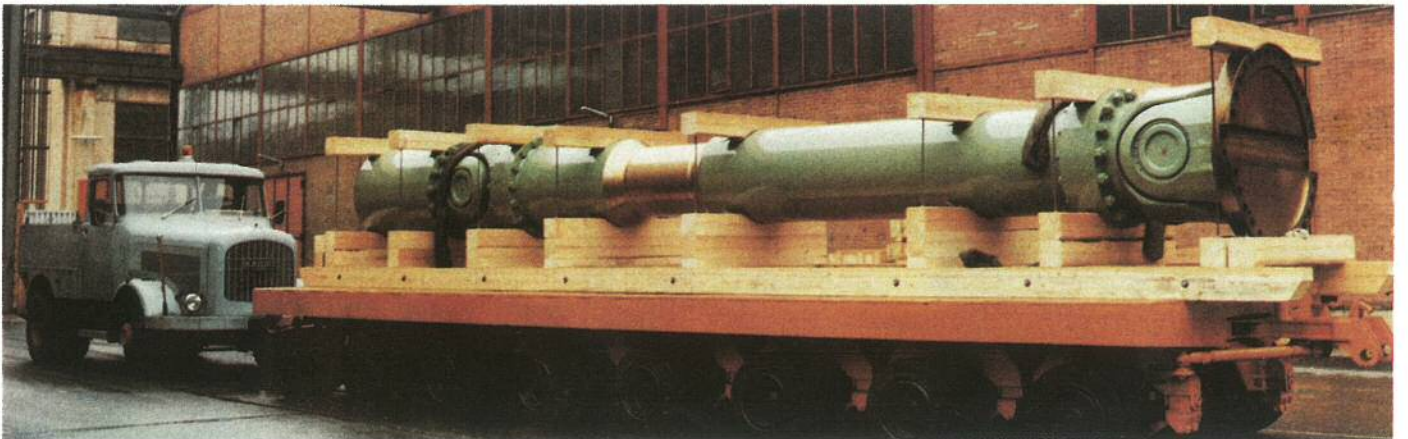
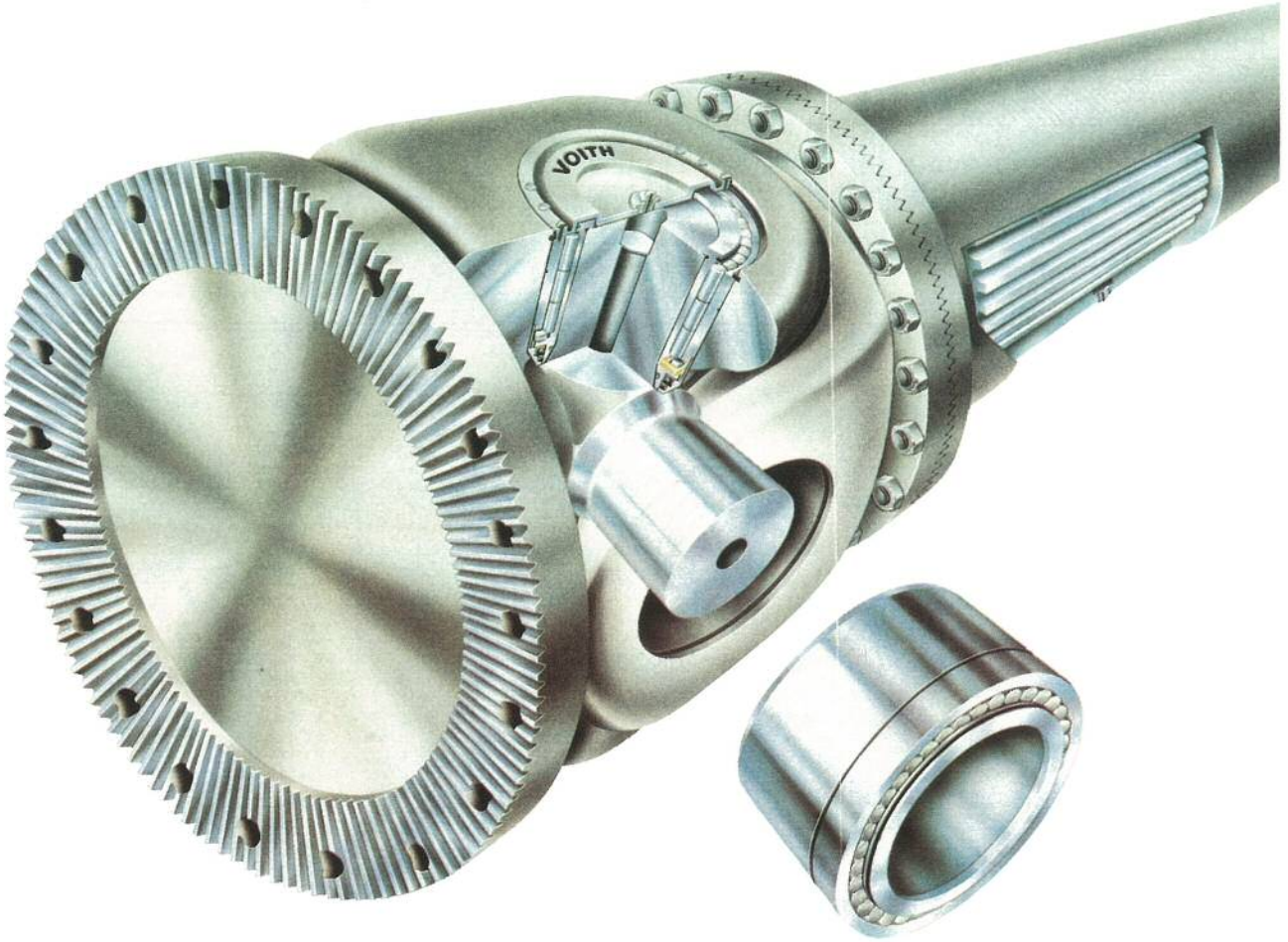
- Non-wearing Cross Member
- Inhibits Bearing Corrosion
- Ease of Maintenance

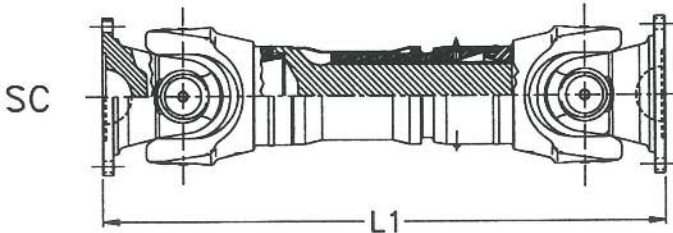
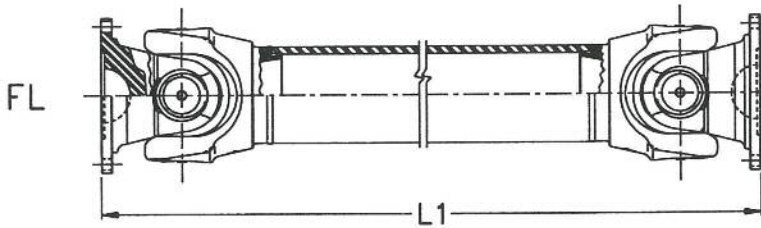
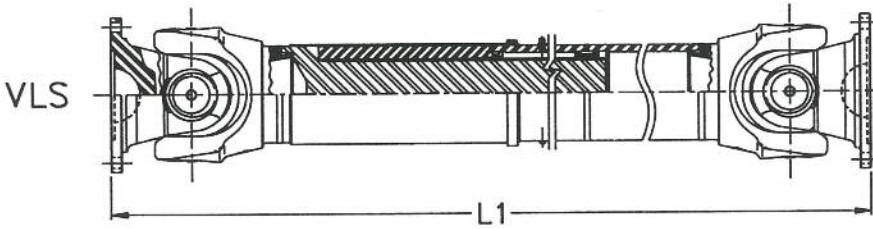
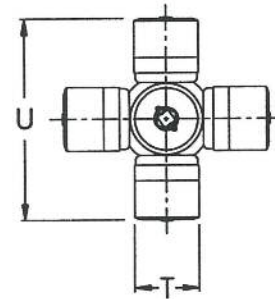
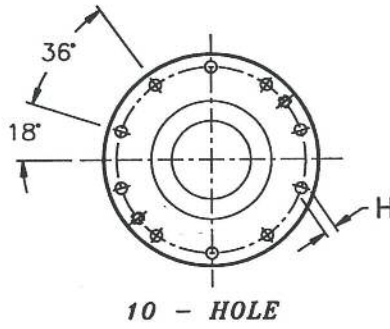
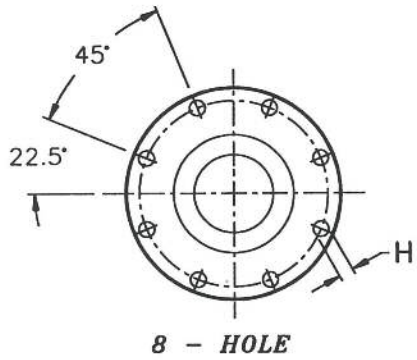
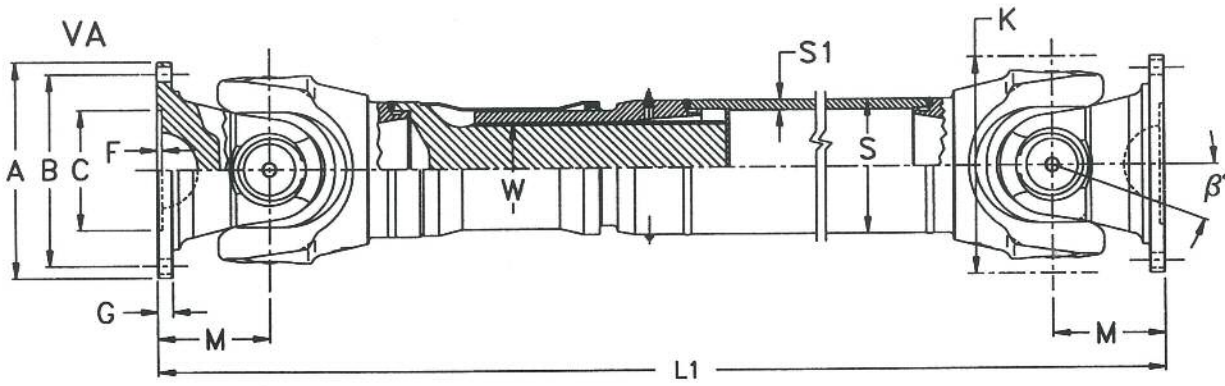
Maximum Torque Capacity

- High Torsional Rigidity
- Extended Service Life
- Ultimate Fatigue Strength

Elastic deflection under load
(exaggerated view)







Series	3300	3310	3320	3330	3340	3350	3360
--------	------	------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	16963	33190	51629	73756	105471	147512	202829
TP	10694	24597	37431	53473	75931	106946	147585
TR	7375	16963	25814	36878	52366	73756	101783
BF	4580	6377	10342	15188	21135	30580	41330

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

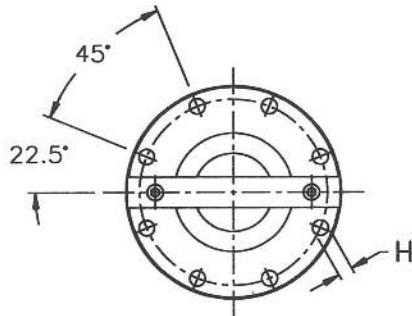
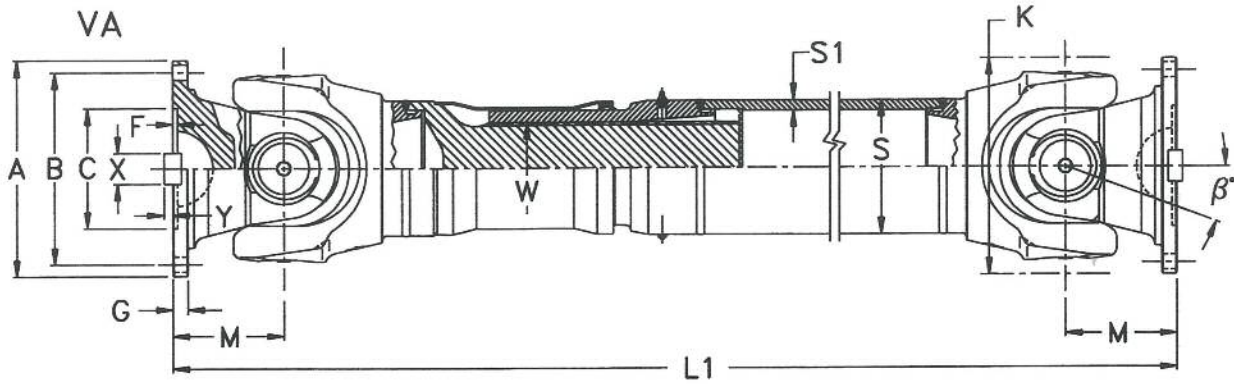
A	8.86	9.84	11.22	12.40	13.78	15.35	17.13
Angle (Deg)	25	15	15	15	15	15	15
B	7.716	8.583	9.646	11.024	12.205	13.583	15.157
C	5.511	5.512	6.89	6.89	8.661	9.843	11.024
F	.196	.236	.276	.276	.315	.315	.394
G	.590	.709	.787	.866	.984	1.259	1.574
H	.629	.708	.787	.866	.866	.944	1.062
I	8	8	8	8	10	10	10
K	7.09	8.19	9.84	11.22	12.40	13.78	15.35
M	4.33	4.72	5.51	6.30	7.09	7.64	8.46
S	5.000	6.000	6.500	7.750	8.750	9.750	10.500
S1	.375	.625	.625	.625	.750	1.000	1.000
T	2.559	2.913	3.267	3.740	4.330	5.118	5.708
U	6.771	7.086	8.661	9.830	10.811	11.874	13.287
W	2.95	3.94	4.33	5.12	5.91	6.69	7.48

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

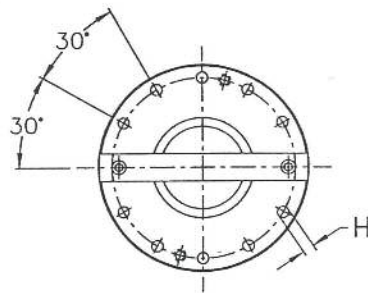
VA	L1	33.07	36.22	40.75	46.85	51.77	55.51	62.60
	L2	5.12	5.51	5.51	5.51	5.51	5.91	6.69
VLS	L1	56.10	59.06	62.20	72.05	77.56	82.28	88.39
	L2	26.77	26.38	26.38	30.31	30.31	31.50	31.50
FL	L1	18.90	20.47	24.41	28.35	31.69	33.66	37.60
SC	L1	21.65	25.20	28.94	34.65	38.58	42.13	47.24
	L2	1.57	2.76	2.36	3.15	3.54	3.54	3.54

VA = Shaft with standard length compensation
 VLS = Shaft with long length compensation
 FL = Fixed length shaft - no compensation
 SC = Short shaft with length compensation

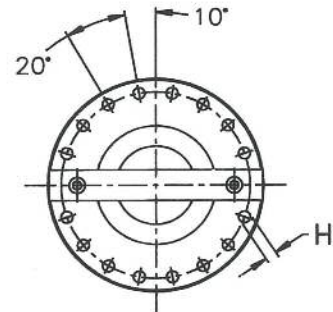
1. Other designs and lengths are available - consult Johnson Power.



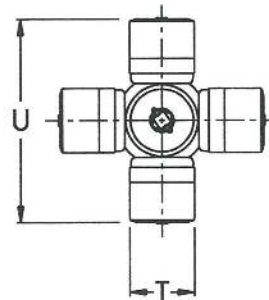
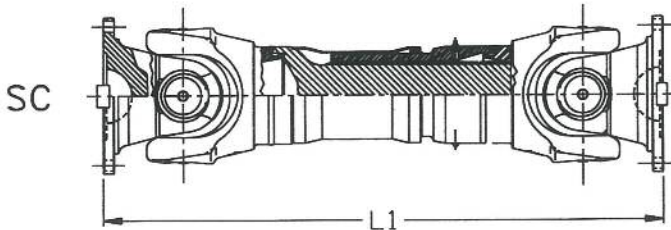
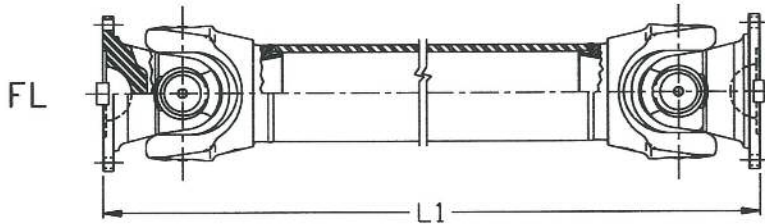
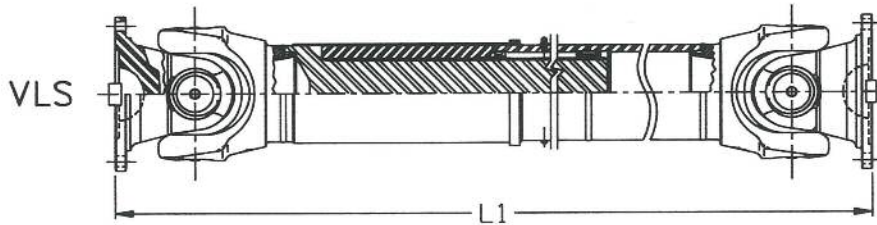
8 - HOLE



10 - HOLE



16 - HOLE



Series	4300	4310	4320	4330	4340	4350	4360	4370	4380
--------	------	------	------	------	------	------	------	------	------

TORQUE RATINGS / ALL TORQUE IN FT. LBS.

TS	33190	51629	73756	105471	147512	202829	368780	457287	737560
TP	24597	37431	53473	75931	106946	147585	267365	331533	534731
TR	16963	25814	36878	52366	73756	101783	184390	228643	368780
BF	6377	10342	15188	21135	30580	41330	55317	73723	100996

DIMENSIONAL DATA / ALL DIMENSIONS IN INCHES

A	8.86	9.84	11.22	12.40	13.78	15.35	17.13	18.90	21.65
Angle (Deg)	15	15	15	15	15	15	15	15	15
B	7.717	8.583	9.646	11.024	12.205	13.583	15.157	16.732	19.370
C	4.134	4.134	4.921	5.118	6.102	6.693	7.480	8.071	9.843
F	.197	.236	.276	.315	.315	.315	.394	.472	.472
G	.787	.984	1.063	1.260	1.378	1.575	1.654	1.850	1.969
H	.669	.748	.827	.905	.905	.984	1.102	1.220	1.220
I	8	8	8	10	10	10	16	16	16
K	8.18	9.84	11.22	12.40	13.77	15.35	17.32	19.29	21.65
M	4.72	5.51	6.29	7.08	7.63	8.46	10.23	10.62	12.00
S	6.000	6.500	7.750	8.750	9.750	10.500	12.750	14.000	16.500
S1	.625	.625	.625	.750	1.000	1.000	1.250	1.250	1.500
T	2.913	3.267	3.740	4.330	5.118	5.708	6.890	7.401	8.464
U	7.086	8.661	9.831	10.811	11.874	13.287	15.315	17.086	18.858
W	3.94	4.33	5.12	5.91	6.69	7.48	10.00	11.00	13.00
X	1.260	1.575	1.575	1.575	1.968	2.756	3.149	3.543	3.937
Y	.354	.492	.590	.590	.630	.708	.787	.886	.886

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	36.22	40.75	46.85	51.77	55.51	62.60	73.82	78.15	90.55
	L2	5.51	5.51	5.51	5.51	5.91	6.69	7.48	7.48	9.45
VLS	L1	59.06	62.20	72.05	77.56	82.28	88.39	98.82	103.15	121.46
	L2	26.38	26.38	30.31	30.31	31.50	31.50	31.50	31.50	39.37
FL	L1	20.47	24.41	28.35	31.69	33.66	37.60	45.47	47.44	53.35
SC	L1	25.20	28.94	34.65	38.58	42.13	47.24	51.18	59.84	66.14
	L2	2.76	2.36	3.15	3.54	3.54	3.54	2.76	5.91	3.15

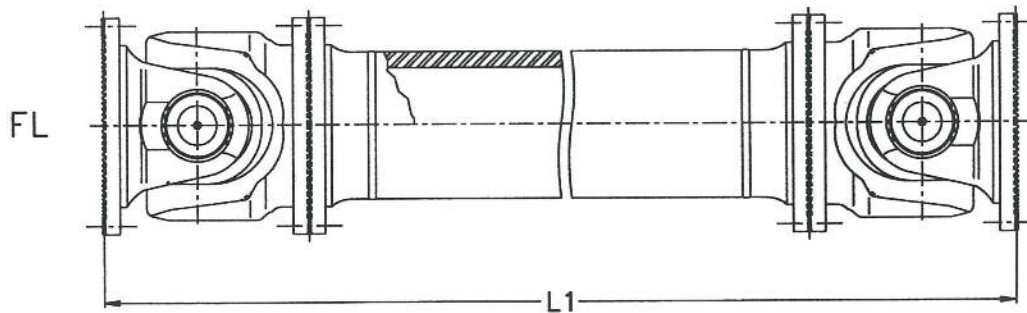
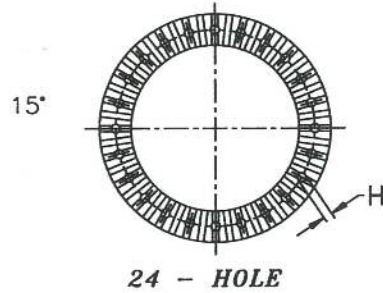
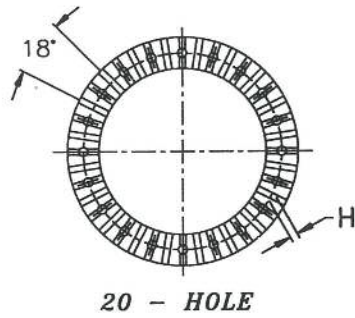
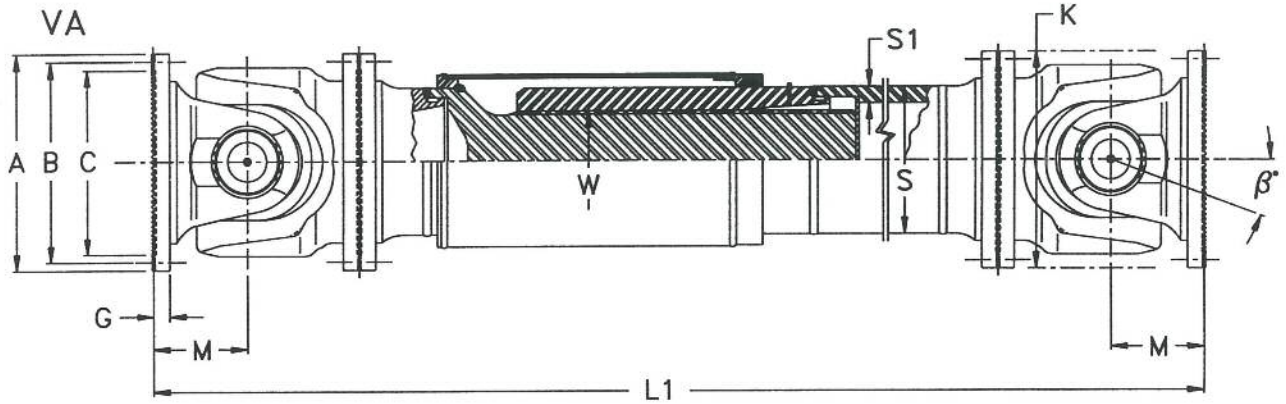
VA = Shaft with standard length compensation

VLS = Shaft with long length compensation

FL = Fixed length shaft

SC = Short shaft with length compensation

1. Other designs and lengths are available - consult Johnson Power.



Series	5005	5020	5035	5050	5065	5080
--------	------	------	------	------	------	------

TORQUE RATINGS/ALL TORQUE IN FT. LBS.

TS	877696	1076837	1843900	2419196	3031371	3732053
TP	800252	983167	1680530	2206410	2766587	3212442
TR	516292	634301	1084213	1423490	1784895	2072543
BF	129338	167593	263983	369547	442258	568067

DIMENSIONAL DATA/ALL DIMENSIONS IN INCHES

A	24.409	26.772	30.709	33.858	36.220	39.370
Angle	15	15	15	15	15	15
B	22.638	25.000	28.543	31.299	33.661	36.220
C	19.685	21.653	25.197	28.740	29.921	33.071
G	2.165	2.165	2.441	2.756	3.150	3.543
H	.984	.984	1.220	1.496	1.496	1.968
I	20	24	24	24	24	20
K	24.41	26.77	30.71	33.86	36.22	39.37
M	13.39	14.57	16.54	19.29	19.69	21.85

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	122.44	127.16	142.52	151.18	179.92	188.58
	L2	9.842	9.842	9.842	9.842	11.81	11.81
FL	L1	73.228	77.953	85.827	96.850	98.425	107.09

VA = Shaft with standard length compensation

FL = Fixed length shaft

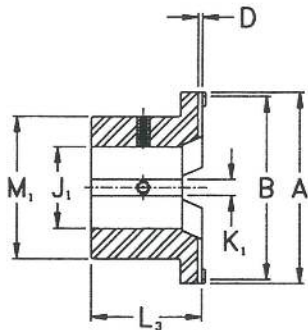
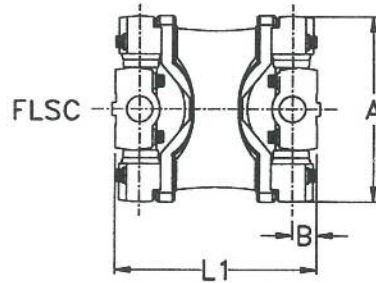
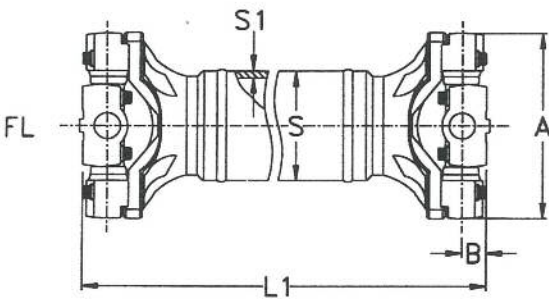
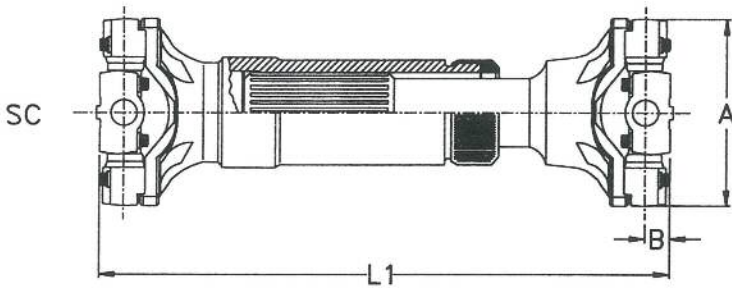
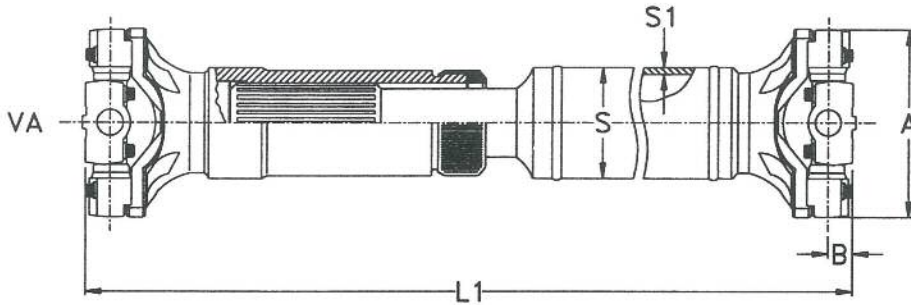
1. **Other designs and lengths are available with TS torque capacities from 840818 lb-ft to 6699330 lb-ft and diameters from 23.622 in. to 48.031. Consult Johnson Power for specific details.**



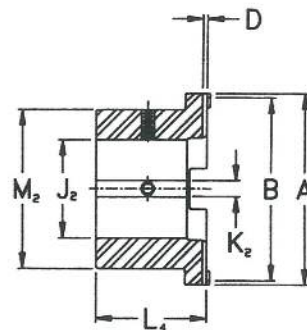
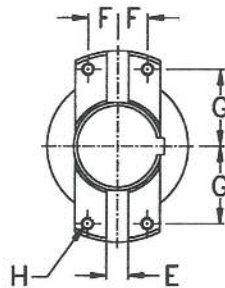
JOHNSON POWER / WING STYLE U-JOINTS

New Improved Design!

PAGE 34



SF



SLF

1. NOTE—Design options are available on most companion flange series.

Series	20W	30W	40W	50W	60W	65W	70W	80W	85W	90W	100W
--------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------

TORQUE RATINGS/ALL TORQUE IN FT. LBS.

TS	600	850	1060	1500	1915	2433	3100	4750	6950	7900	12000
----	-----	-----	------	------	------	------	------	------	------	------	-------

DIMENSIONAL DATA/ALL DIMENSIONS IN INCHES

A	3.34	3.81	4.50	4.78	5.84	5.63	6.22	8.50	6.88	8.62	8.88
Angle(Deg)	20	20	25	15	30	20	25	30	25	30	15
B	.51	.61	.61	.69	.69	.81	.81	.81	1.00	1.00	1.28
S	2.00	2.50	2.50	2.50	3.00	3.50	3.50	4.00	4.00	4.50	5.00
S1	.065	.083	.083	.109	.095	.095	.120	.188	.188	.250	.250

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	11.0	11.5	13.0	13.0	14.5	15.5	16.5	19.0	20.0	21.5	23.5
	L2	1.94	1.75	2.00	2.00	2.25	2.50	2.50	3.00	3.00	3.00	3.25
SC	L1	7.00	7.00	7.50	8.00	8.50	9.25	10.5	13.5	13.0	14.5	-
	L2	1.00	1.00	.75	1.00	1.00	1.25	1.50	1.50	1.75	1.75	-
FL		6.50	7.00	7.00	7.00	9.50	9.00	9.50	11.0	13.0	12.5	13.5
FLSC		2.88	3.38	3.38	4.13	4.13	4.50	5.00	5.00	6.00	6.00	-

FITTING YOKES

A	3.34	3.81	4.50	4.78	5.84	5.63	6.22	8.50	6.88	8.62	8.88
B	3.12	3.56	4.25	4.53	5.53	5.31	5.84	8.12	6.50	8.25	8.38
D	.150	.150	.150	.201	.201	.232	.232	.232	.232	.232	.374
E	.375	.375	.375	.561	.561	.625	.625	.625	.625	.625	1.00
F	.656	.719	.719	.844	.844	.969	.969	.969	1.41	1.41	1.81
G	1.17	1.38	1.72	1.75	2.25	2.25	2.31	3.44	2.44	3.31	3.25
H	.313	.313	.313	.375	.375	.500	.500	.500	.500	.500	.625

MODEL SF - STANDARD FITTING YOKE

J1	1.00	1.18	1.18	1.73	1.77	1.50	2.37	3.00	2.00	2.75	3.00
K1	.250	.250	.250	.375	.375	.375	.625	.750	.500	.750	.750
L3	1.93	1.93	2.95	3.86	3.78	3.94	3.94	5.00	4.40	5.16	4.64
M1	1.85	2.09	2.20	2.64	2.83	3.13	3.54	5.00	3.26	4.13	4.92

MODEL SLF - SPECIAL LARGE FITTING YOKE

J2	1.18	-	1.77	2.55	2.17	-	3.00	-	-	-	4.50
K2	.250	-	.375	.625	.500	-	.750	-	-	-	1.00
L4	1.34	-	3.35	4.06	5.08	-	4.92	-	-	-	7.00
M2	2.09	-	2.83	3.62	3.31	-	4.33	-	-	-	7.09

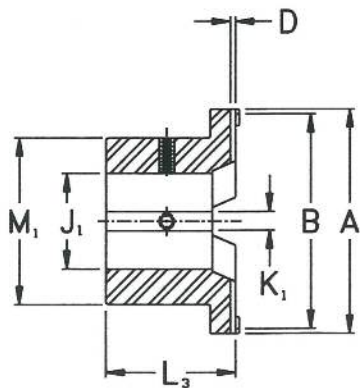
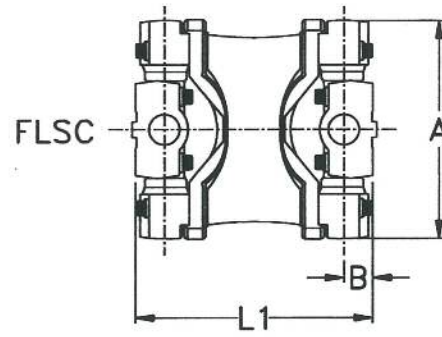
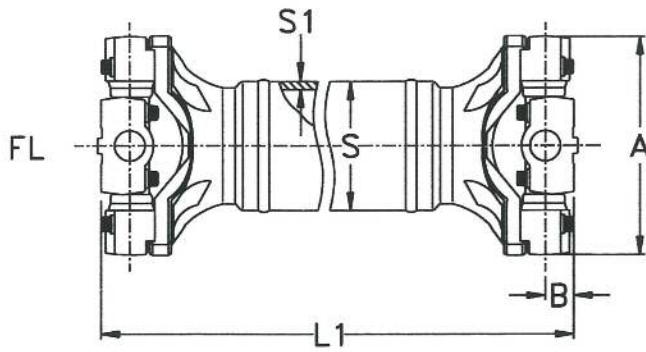
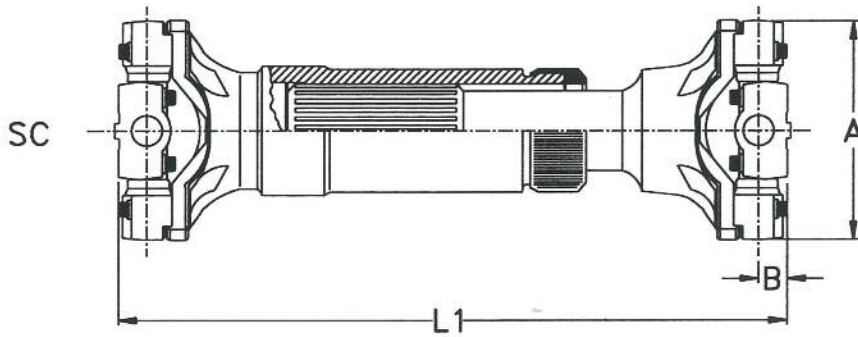
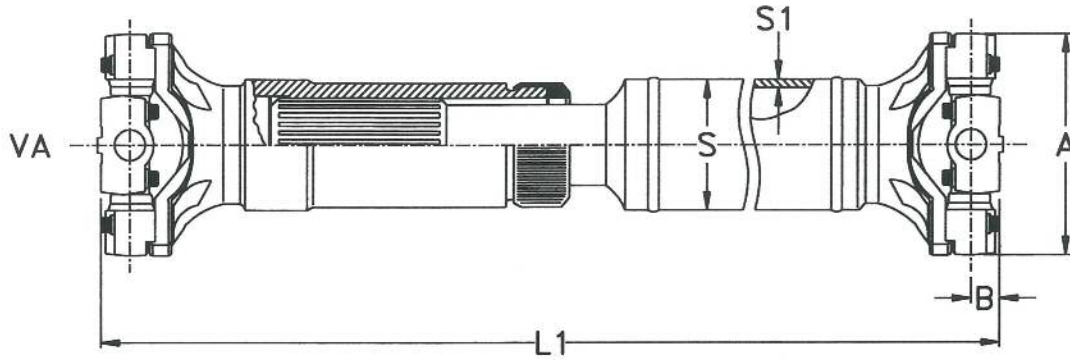
VA = Shaft with standard length compensation

SC = Short shaft with length compensation

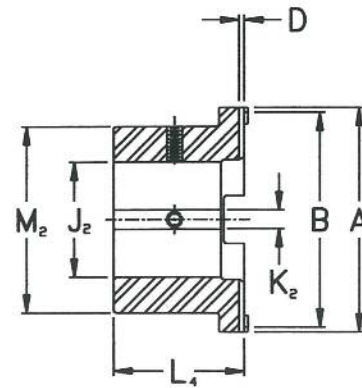
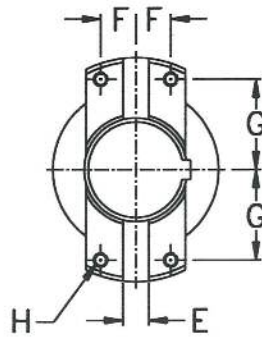
FL = Fixed length shaft

FLSC = Short fixed length shaft

1. Other designs and lengths are available - consult Johnson Power



SF



SLF

SERIES	170W	230W	310W	490W	600W	800W	1200W
--------	------	------	------	------	------	------	-------

TORQUE RATINGS/ALL TORQUE IN FT. LBS.

TS	4250	6100	8400	12500	15100	18000	26000
----	------	------	------	-------	-------	-------	-------

DIMENSIONAL DATA/ALL DIMENSIONS IN INCHES

A	6.75	6.88	8.63	9.25	9.25	10.8	12.2
Angle(Deg)	20	20	20	20	20	20	20
B	.92	1.11	1.11	1.34	1.58	1.50	1.78
S	4.00	4.50	5.00	5.63	6.50	6.50	6.50
S1	.120	.148	.220	.253	.276	.340	.340

MINIMUM LENGTH L1/LENGTH COMPENSATION L2

VA	L1	18.0	21.8	24.5	25.7	26.0	30.3	32.4
	L2	3.00	3.00	5.00	5.00	4.00	5.00	5.00
SC	L1	-	14.4	12.0	18.6	21.0	25.6	21.6
	L2	-	2.00	1.25	2.75	2.50	4.00	1.00
FL		9.80	13.1	13.1	14.0	13.0	17.3	20.0
FLSC*		5.25	6.50	7.00	7.68	-	9.67	-
Angle(Deg)		7	15	15	7	-	7	-

*FLSC design limits maximum angularity.

FITTING YOKES

A	6.75	6.88	8.63	9.25	9.25	10.8	12.2
B	6.38	6.50	8.25	8.75	8.75	10.3	11.5
D	.244	.244	.244	.385	.385	.490	.490
E	.625	.625	.625	1.00	1.00	1.25	1.25
F	1.22	1.41	1.41	1.75	1.75	1.97	2.32
G	2.47	2.44	3.31	3.40	3.40	3.94	4.44
H	.438	.500	.500	.625	.625	.750	.875

MODEL SF - STANDARD FITTING YOKE

J1	2.63	2.75	3.25	4.00	4.00	4.00	4.88
K1	.625	.750	.875	1.00	1.00	1.25	1.50
L3	4.69	4.75	6.56	6.19	6.19	9.00	10.0
M1	4.00	4.69	5.13	6.13	6.13	6.75	8.25

MODEL SLF - SPECIAL LARGE FITTING YOKE

J2	3.75	3.75	4.75	5.50	5.50	6.00	7.00
K2	.875	1.00	1.25	1.25	1.25	1.50	1.75
L4	5.19	5.38	6.56	6.81	6.81	9.00	10.0
M2	6.00	6.00	7.75	7.75	7.75	9.25	10.5

VA = Shaft with standard length compensation

SC = Short shaft with length compensation

FL = Fixed length shaft

FLSC = Short fixed length shaft

1. Other designs and lengths are available - consult Johnson Power.

2. Face keys of 600W series are specially hardened to transmit additional torque.



Pin & Block Universal Joints

Johnson pin & block joints are available in a wide variety of sizes and configurations to replace or interchange with Boston, Curtis, Lovejoy, Atlas, Fenner and others. Simply advise current parts numbers and/or application criteria. We also manufacture units, with splined square or hex bores and with telescoping capacity. Please advise your requirements. Special materials such as bronze, stainless steel and monel metal universal joints are also available.

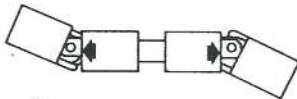
Steel Universal Joint Horsepower Capacities

Joint OD	Angle (Deg)	HP at 100 RPM	HP at 1000 RPM	Breaking Torque (In.Lbs.)
7/8	10	.4	2.8	1600
1	10	.7	4.9	3500
1 1/8	10	.7	4.9	3700
1 1/4	10	1.2	8.4	6000
1 1/2	10	2.0	14	9500
1 3/4	10	3.4	24	15000
2	10	5.2	36	22000
2 7/16	10	9.0	63	30000
2 13/16	10	13		44000 (est.)
3 3/16	10	17		60000 (est.)
4 3/16	10	34		120000 (est.)

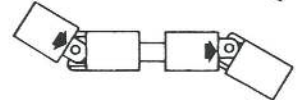
Horsepower capacity decreases as angle increases. Consult Johnson Power for final selection assistance. All dimensions in inches.

Application Recommendations

CORRECT WAY to connect two universal joints to the same shaft.



WRONG WAY to connect two universal joints to the same shaft.



CASE 1. When using two joints with equal angles, and the drive and driven shafts have a common plane, use the "CORRECT WAY" as shown above.

CASE 2. When using two joints with unequal angles, and the drive and driven shafts have a common plane, connect as in Case 1. Keep the difference between the angles at a minimum and keep rpm as low as possible.

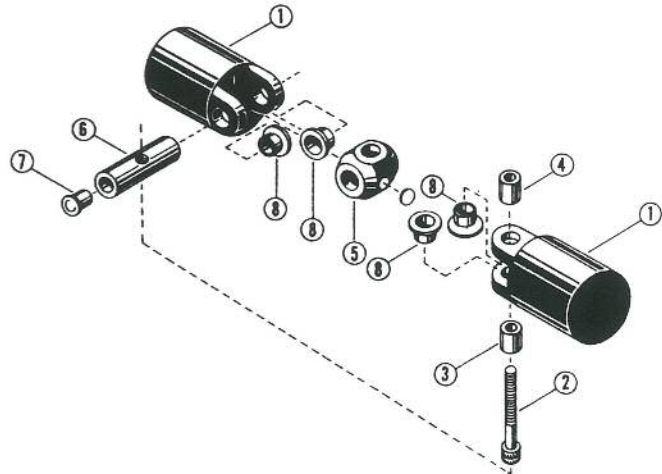
CASE 3. When two joints have equal angles, but the drive and driven shafts do not have a common plane, connect as shown above; then, by trial and error method rotate one joint with respect to the other on the connecting shaft until a smooth drive is obtained.

CASE 4. When two joints have unequal angles and the drive and driven shafts do not have a common plane, keep the difference between the two angles at a minimum, the rpm as low as possible, and follow CASE 3 instructions until smoothest possible drive is obtained.

CASE 5. When using one joint, keep rpm low and make a serious attempt to keep the angle the joint makes with a straight line under 12 degrees.

Note: Whenever possible, use universal joints in pairs running at equal angles.

Assembly Parts



1. Joint Ends or Yokes.
2. Cap Screw. Rivet on 1 1/8" OD and smaller.
3. Sleeve Bushings not threaded.
4. Sleeve Bushings threaded.
5. Center Block. Grease Reservoir on 1 1/2" OD and larger.
6. Cross Pin.
7. Oiler (1 1/2" OD and larger).
8. Collar Bushing (2 7/16" OD and larger).

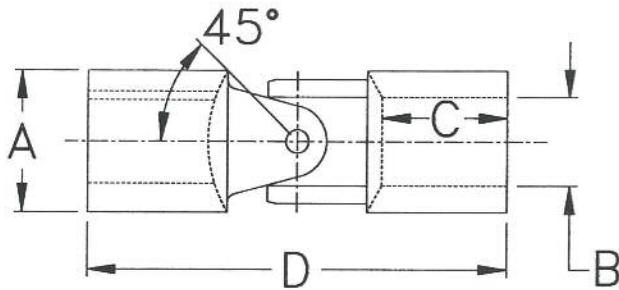
Note: We cannot be responsible for universal joints that have been repaired or disassembled and reassembled outside of our factory.

Single Pin & Block Universal Joint

Note 1: Bore Diameter (Dimension "B") should not exceed 55% of the joint diameter "A".

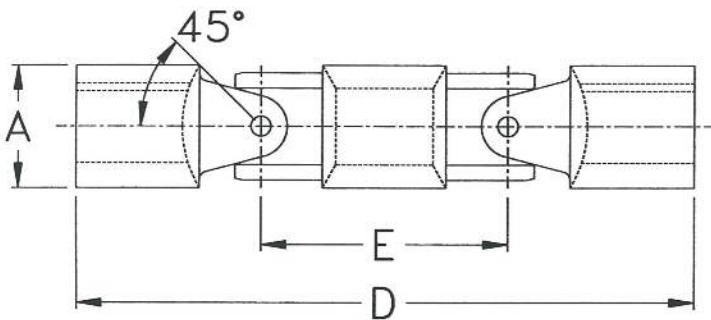
Reference should always be made to dimension "A" to indicate size of universal joint required.

Note 2: 1 1/4" OD joints and smaller are not supplied with oilers.



A Outside Dia.	D1 Standard Length	D2 Short Length	C Length Thru Bore	Weight (Lbs.)
3/4	2 3/4	-	7/8	.20
7/8	3	2 1/4	1	.34
1	3 3/8	3	1	.61
1 1/8	3 5/8	3	1 1/8	.82
1 1/4	3 3/4	2 7/8	1 1/8	1.14
1 1/2	4 1/2	3 3/8	1 3/8	2.07
1 3/4	5 1/4	4	1 5/8	3.20
2	6	4 1/2	1 7/8	4.9
2 7/16	7 1/2	5 1/4	2 3/8	9
2 1/2	7	5 1/4	2 1/8	9
2 13/16	8 1/4	6 3/8	2 5/8	13
3	9	-	2 3/4	20
3 3/16	9 1/2	7 3/8	3	20
4 3/16	11 1/2	8 1/4	3 5/8	40
5 1/4	6			

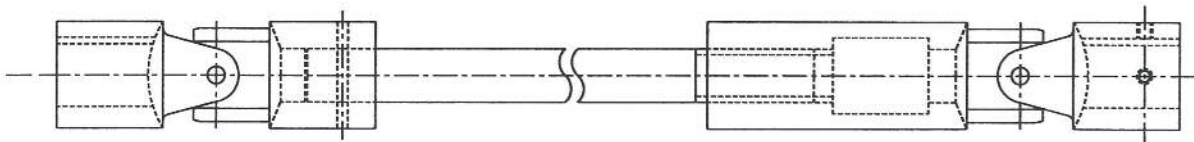
Special Order Only. Data available on request.

**Double Pin & Block Universal Joint
(The shortest double joint on the market.)**


A Outside Dia.	D1 Standard Length	D2 Short Length	E Length of Center Member
7/8	3 3/8	3 3/8	1 1/8
1	4 1/4	3 1/2	1 1/4
1 1/8	4 1/4	3 1/2	1 1/4
1 1/4	5 1/4	4 3/8	1 1/2
1 1/2	6 1/4	5 1/8	1 3/4
1 3/4	7 1/4	6	2
2	8 1/4	6 3/4	2 1/4
2 7/16	10 1/4	8	2 3/4
2 1/2	9 3/4	7 1/2	2 3/4
2 13/16	11 1/4	9 3/8	3
3	12 1/2	10 3/8	3 1/2
3 3/16	13	10 7/8	3 1/2
4 3/16	16 3/4	13 3/4	5 1/4

All dimensions in inches.

**Telescoping Units Available.
Call Johnson Power**





Why use a constant velocity joint assembly?

Where uniform rotary motion is essential...even at high or unequal angles...a constant velocity (Rzeppa) joint is the solution.

Power is transmitted through hardened steel balls which track in machined grooves of the outer and inner race of each assembly, while ball position is maintained by the cage member.

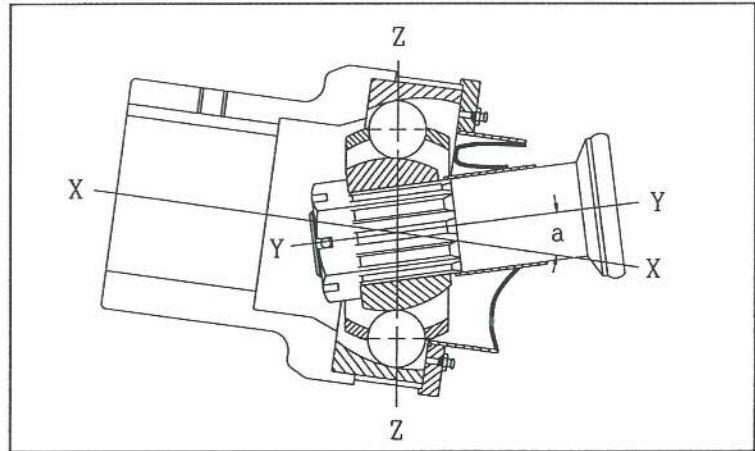
This power transmission method eliminates torsional or inertial excitations inherent in other couplings thereby reducing troublesome vibration.

Selecting a Constant Velocity Drive Shaft.

Identify the following...

1. Max. continuous torque
2. Max running RPM
3. Max. angularity
4. Distance between shaft ends of driving & driven equipment
5. B-10 bearing life required

Example: A 40 HP induction motor at 1800 RPM driving a pinch roll via a gear box with a 3 to 1 speed reduction for a running RPM of 600. Max. angle is 6 deg. Distance between shaft ends is 48". Required bearing life is 8,000 hours minimum.



"Rzeppa" CONSTANT VELOCITY Joint

Driving balls are engaged in transverse grooves and maintained in an angle bisecting plane (Z-Z) by the cage.

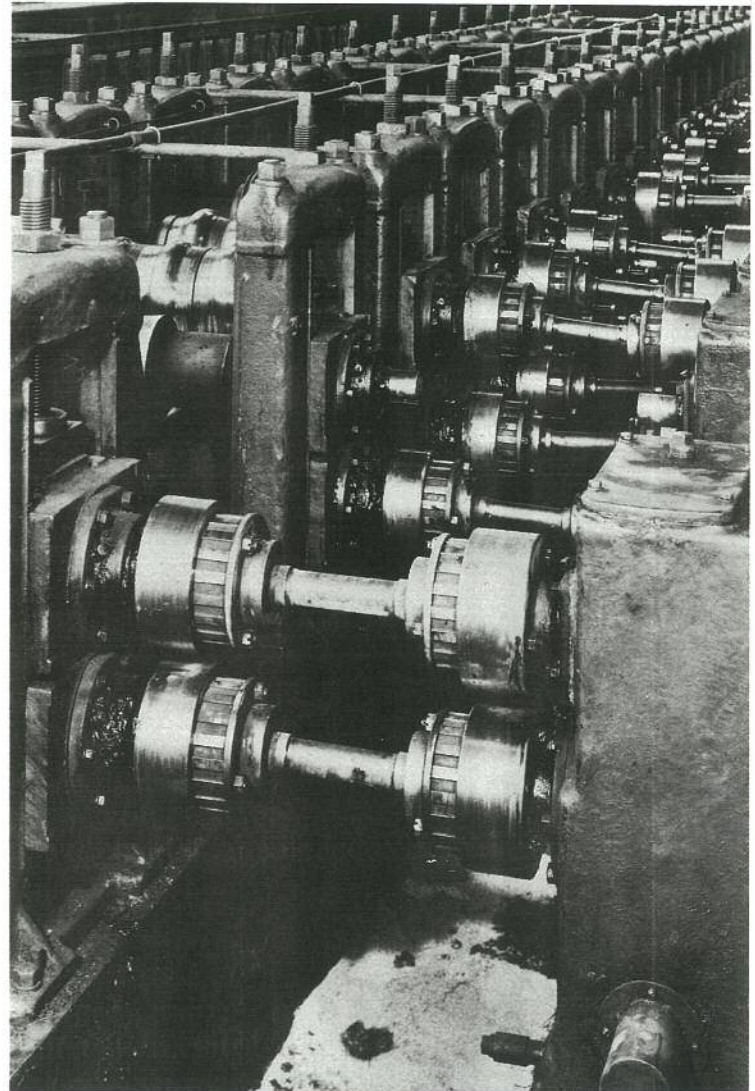


Table A

Disc Joint Series	TORQUE CAPACITIES (lb-ft)		
	Continuous	Short Duration	Maximum Static
1R	169	845	1099
2B	282	1410	1833
3C	363	1815	2360
4E	663	3315	4310
5G	1050	5250	6825
6J	1617	8085	10511
7L	2467	12335	16036
8N	3150	15750	20475
9P	4725	23625	30713

Continuous Torque Capacity: The maximum torque that can be transmitted on a 24 hour a day basis.

Short Duration Torque: The maximum pulsating fatigue torque (vibratory or oscillatory torque) that can be transmitted without fatiguing any component.

Maximum Static Torque: The maximum torque that can be transmitted instantaneously without brinelling or yielding any component.

Table B

Operating Angle Degrees	Recommended Max Speed (RPM) At Operating Angle						Angle Factor For RPM at Angle	
	1R 2B	3C 4E 5G	6J 7L	8N 9P	< 1000	> 1000		
1-4	4000	3000	2500	2000	0.90	0.70		
5	3500	2800	2200	1800	0.89	0.69		
6	3000	2600	2100	1700	0.88	0.68		
7	2800	2400	2000	1600	0.86	0.66		
8	2500	2100	1850	1500	0.84	0.64		
9	2200	1900	1650	1300	0.82	0.62		
10	2000	1700	1500	1200	0.80	0.60		
11	1800	1550	1350	1100	0.78	0.59		
12	1650	1400	1200	975	0.76	0.57		
13	1500	1200	1000	750	0.74	0.56		
14	1300	1050	800	650	0.72	0.54		
15	1200	950	700	550	0.70	0.53		
16	1100	850	600	500	0.68	0.51		
17	950	700	500	450	0.66	0.49		
18	800	600	450	400	0.64	0.48		

Note: For continuous operation at a 10 degree or greater angle, Mechanical Seals are recommended.

Constant Velocity Disc Joints are available with both elastomer and mechanical seals. For temperatures over 180 deg. F or when operating in a caustic environment, mechanical seals are also recommended.

Step 1 - Determine Torque.

$$\begin{aligned} \text{Max. Cont.} &= \frac{40 \text{ HP} \times 5252}{600 \text{ RPM} \times .88 \text{ Angle Factor}} \\ &= 398 \text{ lbs-ft.} \end{aligned}$$

Step 2 - Select the Series to effectively carry this torque. Compare with continuous torque rating in Table A

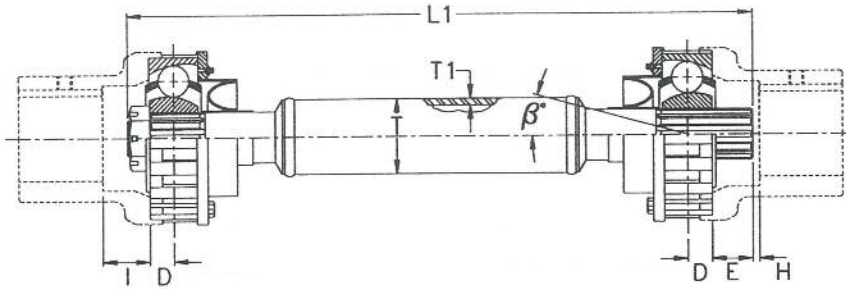
Size 4E with a continuous torque rating of 663 lb-ft is the appropriate choice.

Step 3 - Consult Johnson Power to verify appropriate critical speed safety margins.

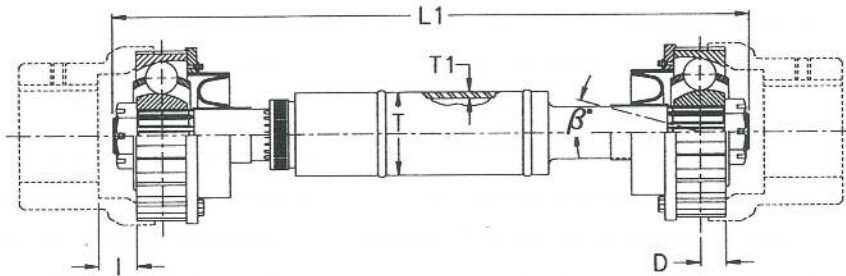
Step 4 - Verify desired bearing life.

Life required = 8,000 hours.

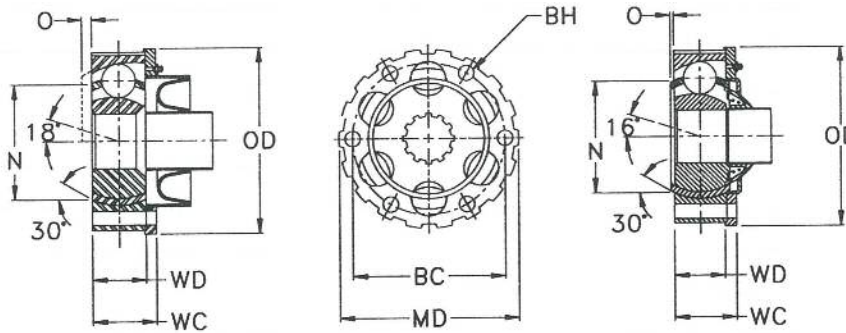
$$\begin{aligned} &1500 \times \left(\frac{1000}{\text{RPM}} \right) \times \left(\frac{\text{Cont Torq Rating} \times \text{Angle Factor}}{\text{Actual Torque}} \right)^3 \\ &= 1500 \times \left(\frac{1000}{600} \right) \times \left(\frac{663 \times .88}{350} \right)^3 = 11,580 \text{ hrs} \end{aligned}$$



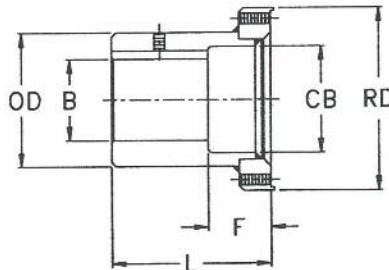
ES - End Slip Design



MS-Mid Slip Design



Disc Joints



Flange & Adapter Ring

Series	1R	2B	3C	4E	5G	6J	7L	8N	9P
--------	----	----	----	----	----	----	----	----	----

DIMENSIONAL DATA/ALL DIMENSIONS IN INCHES

Angle(Deg)	18	18	18	18	18	18	18	18	18
D	.562	.718	.750	.937	1.00	1.15	1.25	1.43	1.50
T	2.00	2.25	2.25	3.00	3.00	3.75	3.75	5.00	5.00
T1	.120	.190	.190	.250	.250	.440	.440	.500	.500
H Clrnce (Min)	.125	.125	.125	.188	.250	.250	.250	.250	.375
I Clrnce (Min)	1.25	1.43	1.62	1.93	2.62	2.50	3.00	2.25	3.87

DISC JOINT DIMENSIONS

OD	3.75	4.43	4.93	5.61	6.75	7.75	8.62	9.25	10.7
MD	3.56	4.25	4.75	5.63	6.50	7.50	8.38	9.00	10.5
WC	1.31	1.66	1.75	2.15	2.31	2.75	3.06	3.43	3.56
WD	1.12	1.43	1.53	1.90	2.00	2.31	2.50	2.87	3.00
BC	3.03	3.56	3.93	4.70	5.50	6.25	7.12	7.75	8.87
BH	.340	.400	.470	.560	.560	.530	.530	.680	.680
N Clearance	2.47	2.81	3.00	3.75	4.31	5.00	5.75	6.25	7.31
O Clearance	.470	.470	.590	.590	.900	.900	1.00	1.12	1.75

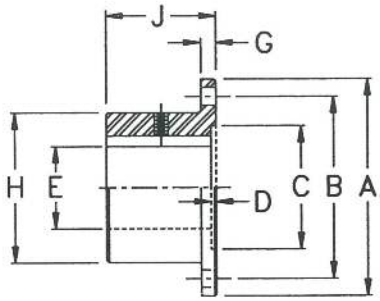
ADAPTER RING & FLANGE

OD	2.43	2.87	3.18	3.87	4.68	5.43	6.31	6.81	7.93
RD	3.75	4.37	4.93	5.81	6.75	7.75	8.62	9.25	10.7
B Max. Bore	1.87	2.25	2.37	2.87	3.37	4.00	4.62	5.25	6.50
CB	2.12	2.50	2.62	3.25	3.75	4.37	5.00	5.75	7.00
F	1.25	1.43	1.62	1.93	2.62	2.50	3.00	2.25	3.87
L	3.25	3.68	4.00	4.81	6.00	6.50	7.625	7.50	10.3

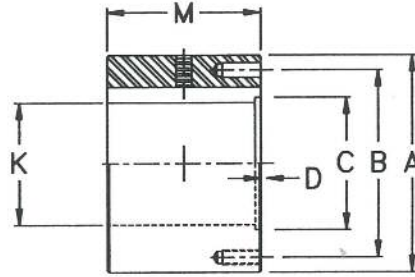
MINIMUM LENGTH L1/LENGTH COMPENSATION L2

ES END SLIP									
L1	10.0	11.6	12.5	14.9	17.0	20.8	23.5	22.6	29.4
L2	1.12	1.31	1.50	1.75	2.37	2.25	2.75	2.00	3.50
MS MID SLIP									
L1	17.1	-	-	23.8	24.1	27.4	33.3	34.9	38.2
L2	6.00	-	-	6.00	6.00	6.00	6.00	5.50	5.50

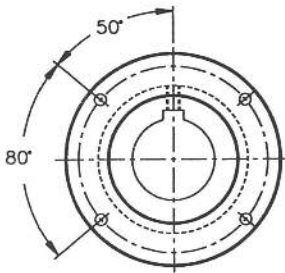
1. Other designs and lengths are available - consult Johnson Power.



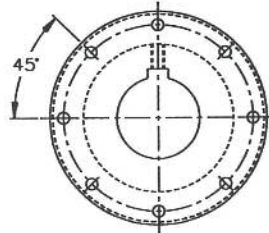
SF



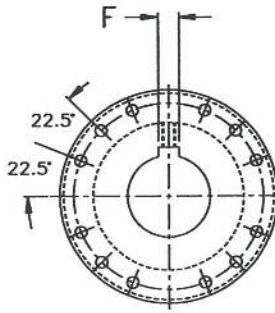
SLF



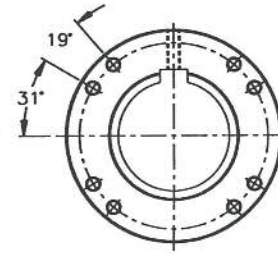
STYLE #1



STYLE #2



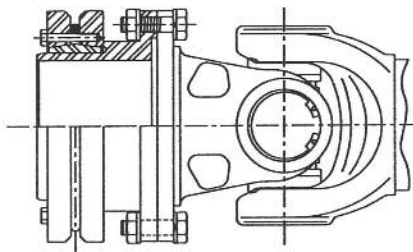
STYLE #3



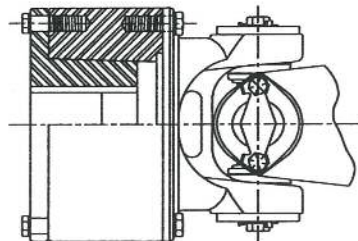
STYLE #4

Design Options

**External
Shrink
Disk
Locking Device**



**Taperlock
Bushing
Locking
Device**



1. NOTE—Design options are available on most companion flange series.

Series	27-31	37-41	48-55	61	71	81	88-91
--------	-------	-------	-------	----	----	----	-------

DIMENSIONAL DATA

A	3.88	4.56	5.88	6.88	8.00	8.00	9.63
B	3.125	3.750	4.750	6.125	7.250	7.250	8.250
C	2.375	2.750	3.750	6.625	7.750	7.750	7.000
D	.078	.078	.093	.063	.063	.063	.140

MODEL SF (STANDARD FLANGE)

E-MAX BORE	1.687	1.875	2.437	3.125	4.000	4.000	4.625
MAX. KEYWAY	.375	.500	.625	.750	1.000	1.000	1.125
G	.375	.375	.375	.375	.375	.375	.625
H	2.437	2.875	3.750	5.250	6.375	6.375	6.875
J	2.000	2.000	2.500	3.500	4.000	4.000	5.000
MIN. BORE	.750	1.000	1.250	1.250	1.250	1.250	1.500
MAX. WEIGHT	3.14	4.25	8.61	21.78	36.56	36.56	56.12

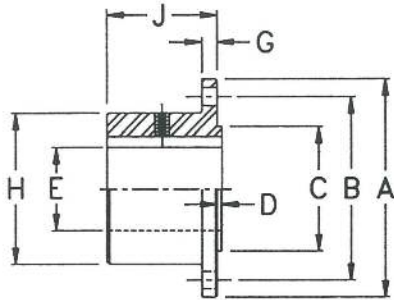
MODEL SLF (SPECIAL LARGE FLANGE)

K-MAX BORE	2.375	2.750	3.750	4.500	5.500	5.500	6.375
MAX. KEYWAY	.625	.750	1.000	1.125	1.250	1.250	1.250
M	2.500	3.000	3.000	5.000	6.000	6.000	6.000
MIN. BORE	1.375	1.750	2.375	3.125	3.500	3.500	4.250
MAX. WEIGHT	7.27	11.79	22.38	41.52	68.77	68.77	99.10

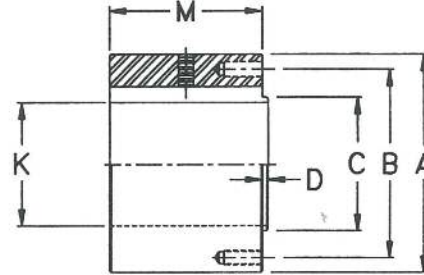
BOLT HOLE SPACING

STYLE	#1	#1	#1	#2	#2	#3	#4
# BOLTS	4	4	4	8	8	12	8
THREAD SIZE	3/8-24	7/16-20	1/2-20	3/8-24	3/8-24	7/16-20	5/8-18
BOLT TORQUE	30 lbs. ft.	50 lbs. ft.	75 lbs. ft.	30 lbs. ft.	30 lbs. ft.	50 lbs. ft.	210 lbs. ft.

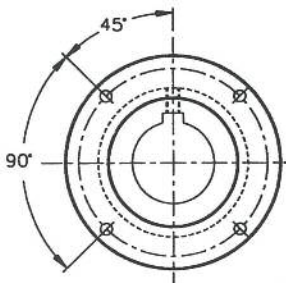
- 1. Flange Selection:** Select companion flange with the same "A" diameter and number of bolt holes as the U-Joint Shaft selected. Bore size will determine whether to use an SF or SLF style.



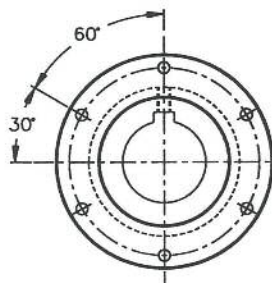
SF



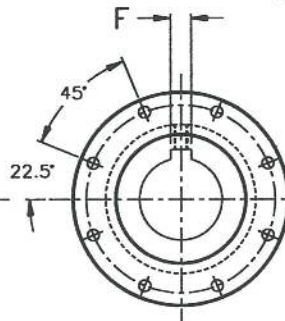
SLF



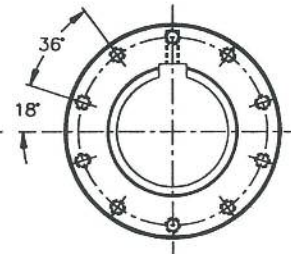
STYLE #1



STYLE #2

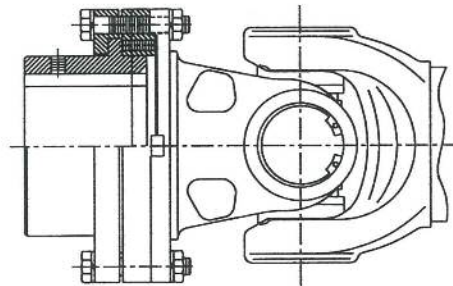


STYLE #3

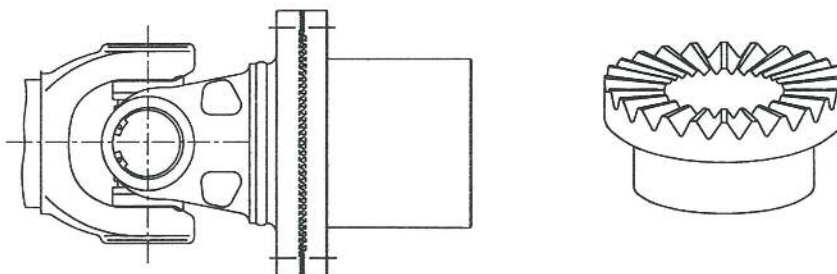


STYLE #4

Design Options



Circumferential adjustable flange allows 360° adjustment for timing purposes



Hirth Serrated Flange transmits maximum torque in a compact connection while minimizing number of bolts.

1. NOTE—Design options are available on most companion flange series.

Series	75	90	100	120	150	180-8	180-10
--------	----	----	-----	-----	-----	-------	--------

DIMENSIONAL DATA

A	2.95	3.54	3.94	4.72	5.91	7.09	7.09
B	2.441	2.933	3.307	3.996	5.118	6.122	6.122
C	1.653	1.850	2.244	2.953	3.543	4.331	4.331
D	.065	.080	.080	.082	.082	.082	.082

MODEL SF (STANDARD FLANGE)

E-MAX BORE	1.188	1.562	1.687	2.125	2.875	3.500	3.500
MAX. KEYWAY	.250	.375	.375	.500	.750	.875	.875
G	.250	.312	.375	.375	.375	.500	.500
H	1.750	2.417	2.562	3.250	4.312	5.187	5.125
J	1.500	2.000	2.000	2.500	3.000	4.000	4.000
MIN. BORE	.500	.625	.625	.750	1.000	1.250	1.250
MAX. WEIGHT	2.5	3.5	4.0	7.0	14.0	24.0	24.0

MODEL SLF (SPECIAL LARGE FLANGE)

K-MAX BORE	1.500	1.750	2.125	2.937	3.375	4.125	4.125
MAX. KEYWAY	.250	.375	.500	.750	.875	1.000	1.000
M	2.000	2.500	2.500	3.000	4.000	4.500	4.500
MIN. BORE	1.000	1.250	1.500	1.750	2.250	2.750	2.750
MAX. WEIGHT	4.5	5.8	7.5	13.0	27.0	41.0	41.0

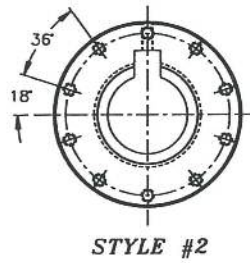
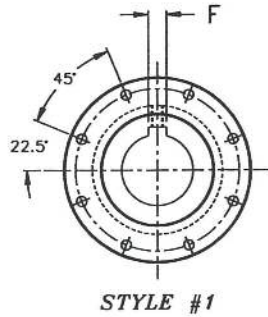
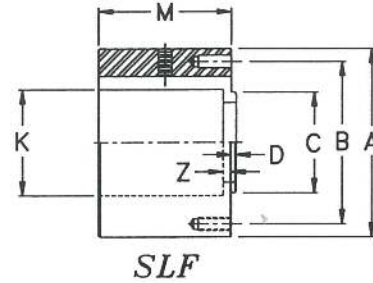
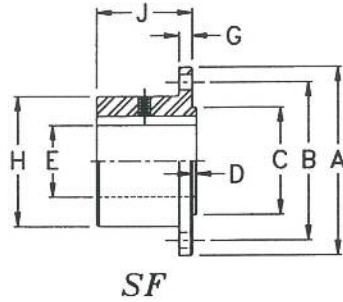
BOLT HOLE SPACING

STYLE	#2	#1	#2	#3	#3	#3	#4
# BOLTS	6	4	6	8	8	8	10
THREAD SIZE	M6	M8	M8	M10	M12	M14	M16
BOLT TORQUE	10 lbs. ft.	25 lbs. ft.	25 lbs. ft.	50 lbs. ft.	90 lbs. ft.	140 lbs. ft.	210 lbs. ft.

FITS JOINT SERIES

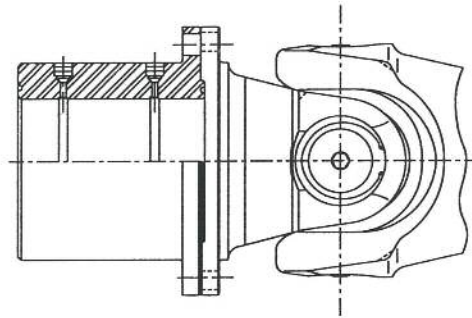
	1115	1125	1135	1145	2105	2135	2160
	1120	1130	1140	1250	2115	2145	2170
	1220	1230	1240	2100	2125	2155	2250
		2300	2305	2110	2130	2225	2260
				2120	2140	2235	2365
				2200	2150	2240	2370
				2210	2205	2340	2380
				2310	2215	2345	2390
					2220	2350	
					2230	2355	
					2315		
					2320		
					2325		
					2330		
					2335		

1. Flange Selection: Select companion flange with the same "A" diameter and number of bolt holes as the U-Joint Shaft selected.
Bore size will determine whether you use an SF or SLF style.

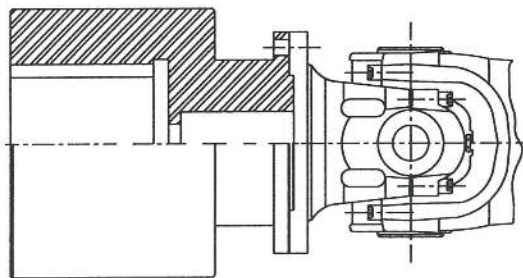


Design Options

Flange Ported for Hydraulic Removal



Special Large Thru-Bolt Design for Maximum Bore Dia.



1. NOTE—Design options are available on most companion flange series.

Series	225	250	285	315	350	390	435
--------	-----	-----	-----	-----	-----	-----	-----

DIMENSIONAL DATA

A	8.86	9.84	11.22	12.40	13.78	15.35	17.13
B	7.716	8.583	9.646	11.024	12.205	13.583	15.157
C	5.512	5.512	6.890	6.890	8.661	9.843	11.024
D	.157	.197	.236	.236	.276	.276	.354

MODEL SF (STANDARD FLANGE)

E-MAX BORE	4.437	4.937	5.562	6.437	7.250	8.062	8.937
MAX. KEYWAY	1.000	1.250	1.500	1.750	2.000	2.250	2.250
G	.625	.750	.812	.875	1.000	1.125	1.250
H	6.687	7.437	8.375	9.687	10.875	12.093	13.468
J	5.500	6.000	7.000	8.000	9.000	10.000	11.000
MIN. BORE	1.500	2.000	2.000	2.250	2.500	2.750	3.000
MAX. WEIGHT	56.12	75.99	113.20	169.00	239.20	361.80	450.10

MODEL SLF (SPECIAL LARGE FLANGE)

K-MAX BORE	5.875	6.562	7.500	8.250	9.000	10.000	11.375
MAX. KEYWAY	1.500	1.500	2.000	2.250	2.250	2.500	2.500
M	7.250	8.250	9.375	10.250	11.250	AS REQ'D	AS REQ'D
Z	.375	.375	.375	.375	.500	.500	.500
MIN. BORE	2.000	2.250	2.500	2.750	3.000	3.250	3.500
MAX. WEIGHT	119.50	167.75	248.10	331.80	450.60	-	-

BOLT HOLE SPACING

STYLE	#1	#1	#1	#1	#2	#2	#2
# BOLTS	8	8	8	8	10	10	10
THREAD SIZE	M16	M18	M20	M22	M22	M24	M27
BOLT TORQUE	210 lbs. ft.	280 lbs. ft.	400 lbs. ft.	545 lbs. ft.	545 lbs. ft.	700 lbs. ft.	1030 lbs. ft.

FITS JOINT SERIES

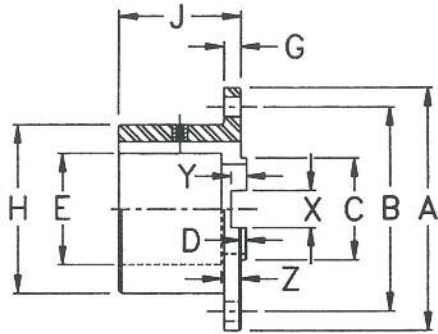
2165	2180	2295	3130	3140	3150	3160
2175	2275	3120	3230	3240	3250	3260
2245	2290	3220	3330	3340	3350	3360
2255	3110	3320				
2265	3310					
2270						
2360						
2375						
2385						
2395						
3300						

1. **Flange Selection:** Select companion flange with the same "A" diameter and number of bolt holes as the U-Joint Shaft selected. Bore size will determine whether you use an SF or SLF style.

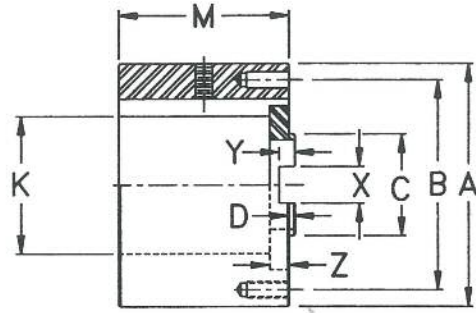


JOHNSON POWER / Companion Flanges

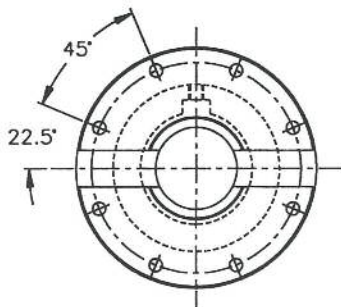
PAGE 50



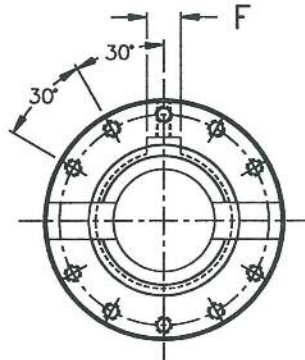
SF



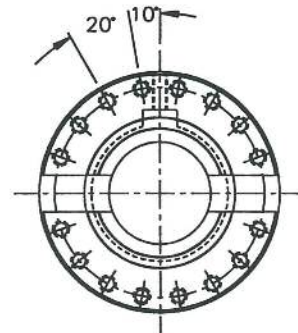
SLF



STYLE #1

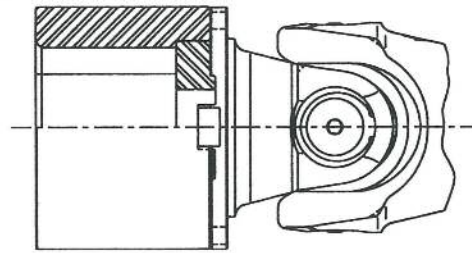
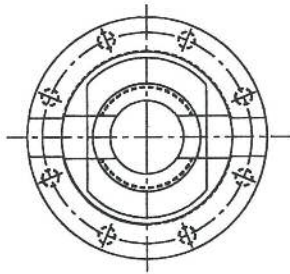


STYLE #2

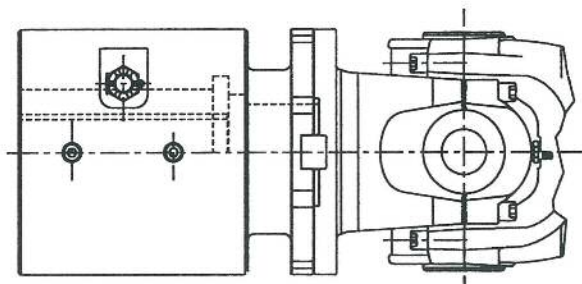
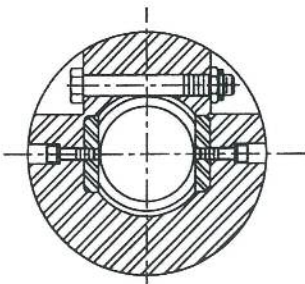


STYLE #3

Design Options



Flange equipped with integrated bore including hardened mill flats



Special large thru-bolt design for maximum bore including hardened keeper pads for mill flats & locking pin

1. NOTE—Design options are available on most companion flange series.

Series	225DK	250DK	285DK	315DK	350DK	390DK	435DK
--------	-------	-------	-------	-------	-------	-------	-------

DIMENSIONAL DATA

A	8.86	9.84	11.22	12.40	13.78	15.35	17.13
B	7.716	8.583	9.646	11.024	12.205	13.583	15.157
C	4.134	4.134	4.921	5.118	6.102	6.693	7.480
D	.177	.197	.236	.276	.276	.276	.354
X	1.260	1.575	1.575	1.575	1.969	2.756	3.150
Y	.354	.492	.591	.591	.630	.709	.787
Z	.875	1.000	1.125	1.125	1.125	1.250	1.312

MODEL SF (STANDARD FLANGE)

E-MAX BORE	4.437	4.937	5.562	6.437	7.250	8.000	8.937
MAX. KEYWAY	1.250	1.250	1.500	1.750	2.000	2.000	2.250
G	.812	1.000	1.062	1.250	1.375	1.625	1.687
H	6.687	7.437	8.375	9.687	10.875	12.093	13.468
J	5.500	6.000	7.000	8.000	9.000	10.000	11.000
MIN. BORE	1.500	1.750	2.000	2.250	2.500	2.750	3.000
MAX. WEIGHT	57.80	78.70	115.60	173.10	243.90	338.70	460.70

MODEL SLF (SPECIAL LARGE FLANGE)

K-MAX BORE	5.875	6.562	7.500	8.250	9.125	10.250	11.375
MAX. KEYWAY	1.500	1.750	2.000	2.250	2.250	2.500	2.750
M	7.375	8.000	9.000	10.000	11.000	AS REQ'D	AS REQ'D
MIN. BORE	2.000	2.250	2.500	2.750	3.500	4.000	4.000
MAX. WEIGHT	121.60	162.70	238.40	323.90	432.70	-	-

BOLT HOLE SPACING

STYLE	#1	#1	#1	#2	#2	#2	#3
# BOLTS	8	8	8	10	10	10	16
THREAD SIZE	M16	M18	M20	M22	M22	M24	M27
BOLT TORQUE	210 lbs. ft.	280 lbs. ft.	400 lbs. ft.	545 lbs. ft.	545 lbs. ft.	700 lbs. ft.	1030 lbs. ft.

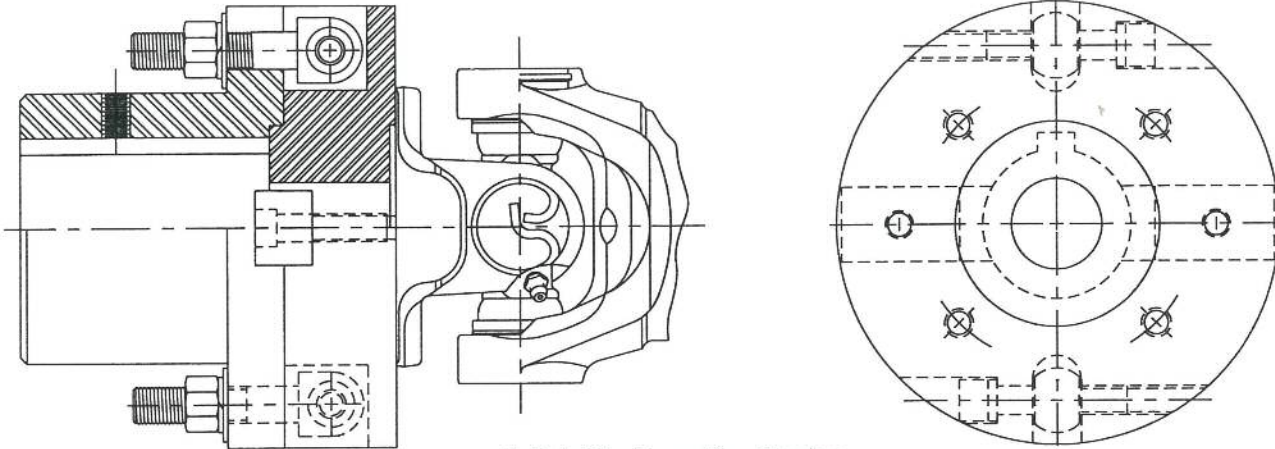
FITS JOINT SERIES

4100	4110	4120	4130	4140	4150	4160
4200	4210	4220	4230	4240		
4300	4310	4320	4330	4340	4350	4360

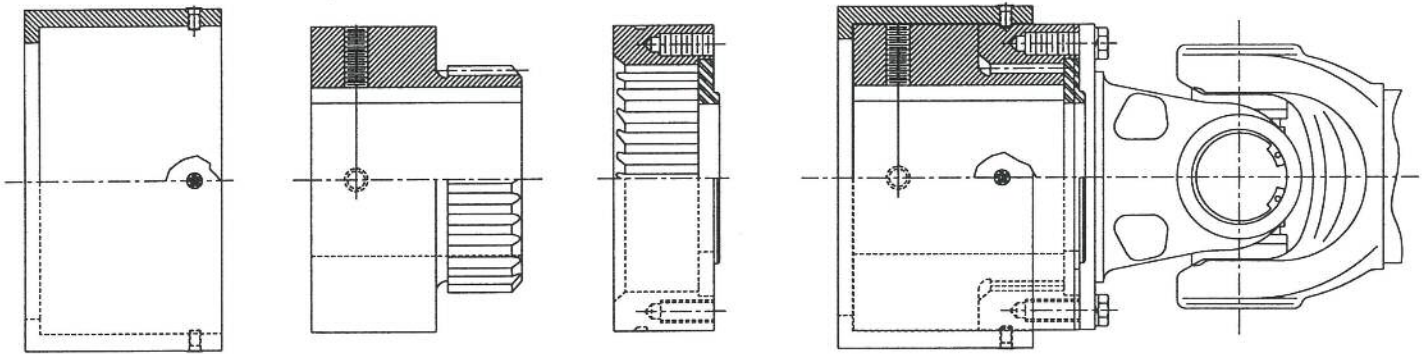
1. Flange Selection: Select companion flange with the same "A" diameter and number of bolt holes as the U-Joint Shaft selected. Bore size will determine whether you use an SF or SLF style.

Design Options/QUICK DISCONNECTS

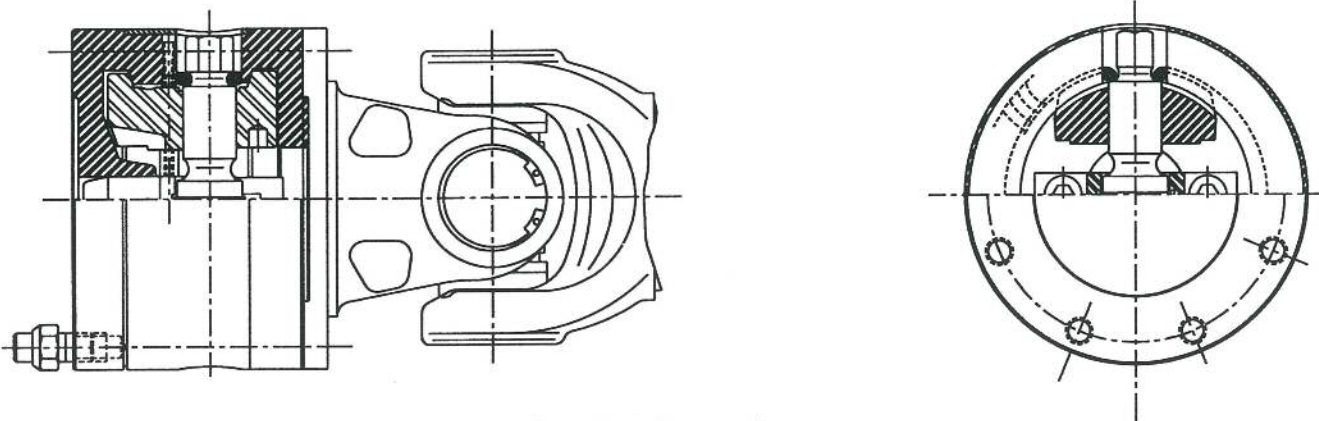
Quick Disconnects are available in a range of designs, torque capacities and RPM ranges, consult Johnson Power for final selection assistance.



• Latch Pin Face Key Design
(Thru bolt design available)

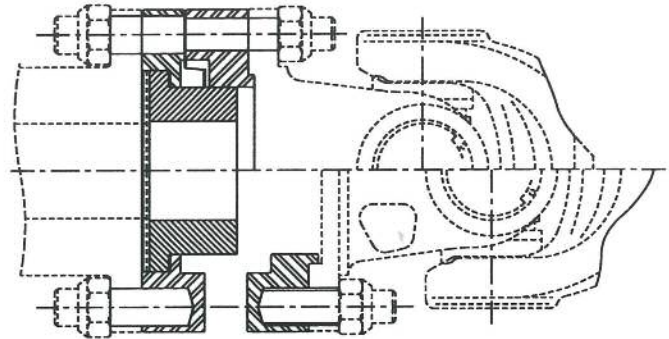
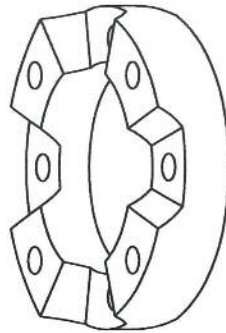


• Splined Connection



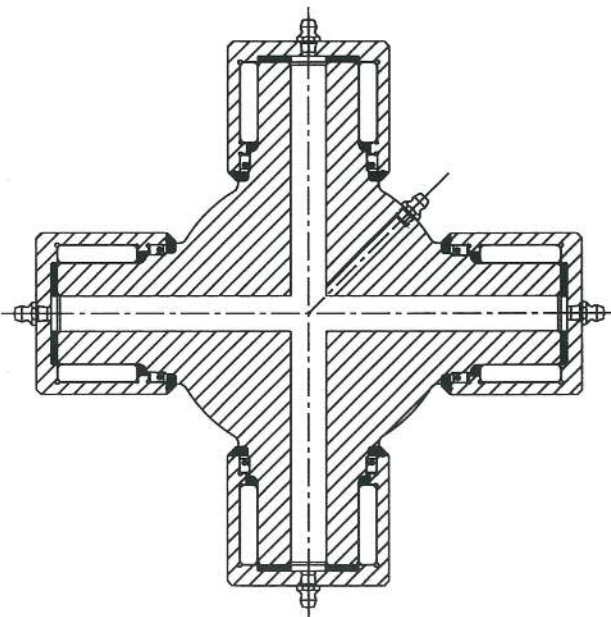
• Serrated Connection
with connecting jaws

- Dog Tooth Connection
(2 bolt connection)

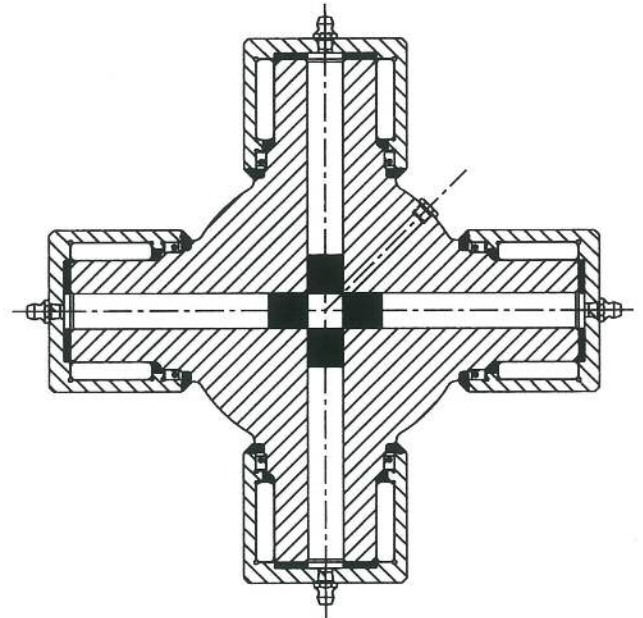


Design Options/4-Pt. Lubrication

4-Pt lubrication fittings at the end of each bearing cap provide easy access and insure positive lubrication.



STYLE 1 Provides lubrication from any bearing position.

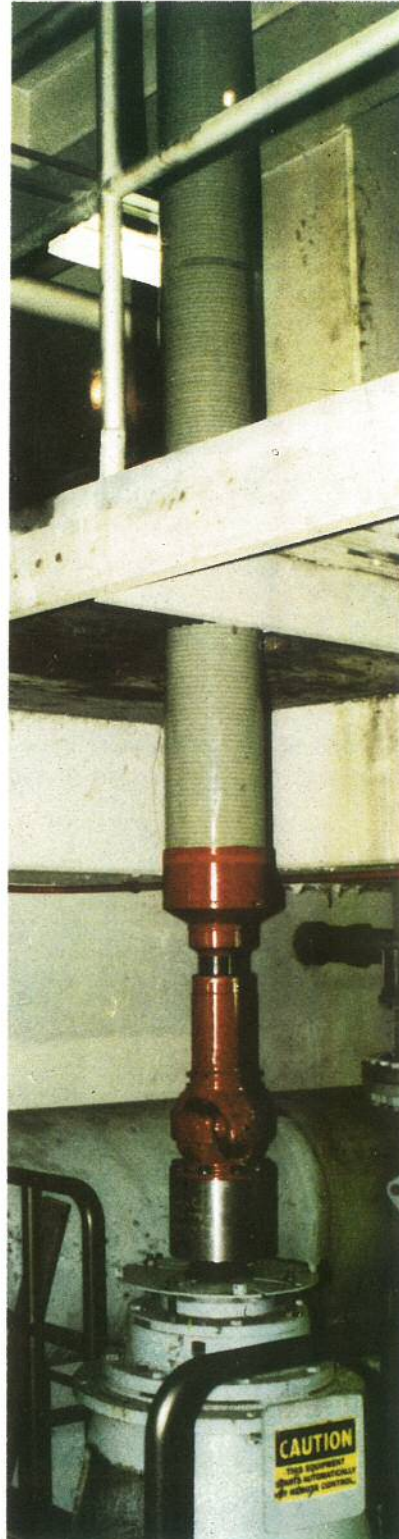
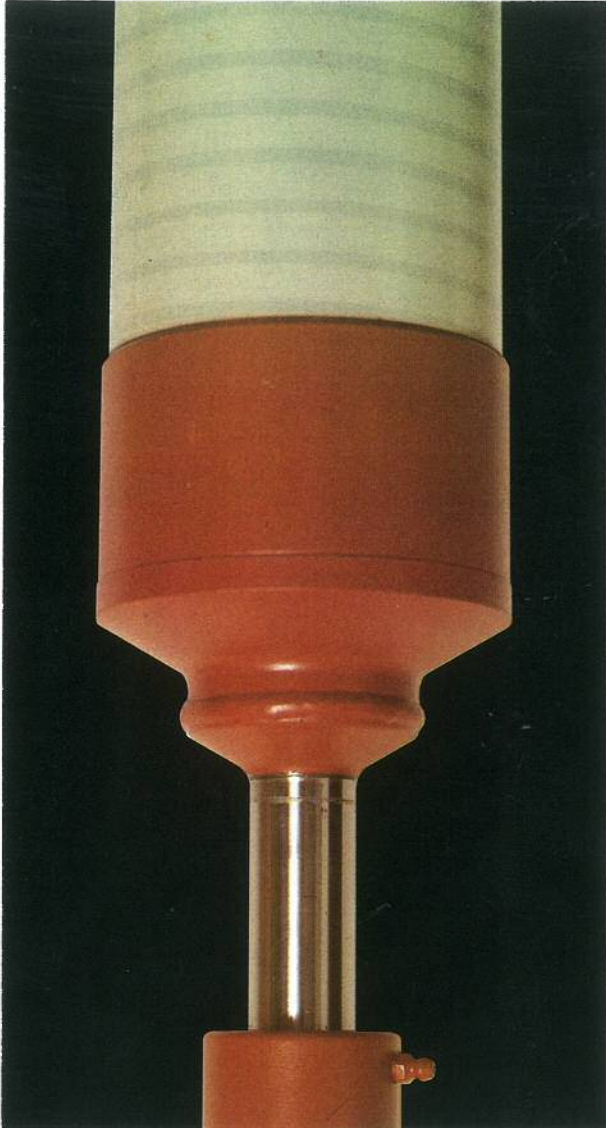


STYLE 2 Insures lubrication of each point that is being lubed. Requires each bearing to be lubricated individually.



Design Options / Composite Tubing

Composite tubing is available in a wide range of diameters to compliment the Johnson Power universal joint line.



Composite tubing offers...

- Light weight (1/5 of steel tubing)
- Higher critical speeds
- Longer shaft lengths
- Corrosion resistance
- Isolation of electric current
- Reduced stress on mating components

Installation and Maintenance

Following is general data covering the proper handling, installation and maintenance of Johnson Power universal joint shafting.

More specific data is available based upon each individual application.

IF THERE ARE ANY QUESTIONS CONCERNING PROPER INSTALLATION AND MAINTENANCE, CONTACT JOHNSON POWER BEFORE PROCEEDING.

Transport and Storage

1. Examine all shafting and related material upon arrival and note any damage on bill of lading. Such damage is the responsibility of the freight carrier.
2. All transport and storage should be in a horizontal position only.
3. Do not stack any items on shafting and flanges.
4. **For long-term storage, shafting should be crated, supported and protected against corrosion. Such shafting should be rotated on a monthly basis to prevent flat spots and effect lubrication.**

Lubrication

To guarantee peak performance and maximum life requires a proper lubrication program.

1. Cross & bearings and splined telescoping assembly must be lubricated prior to start-up.
2. Use only a good quality lithium base E.P. grease meeting N.L.G.I. grades 1 or 2, i.e. Texaco Multifak EP2, Shell Alvania EP2 or Mobilux EP2.
3. Add lubricant to universal joint until it appears at all four bearing seals. At splined telescoping assembly, grease must appear at pressure relief hole.
4. Lubrication intervals should be every 500 hours of normal service or every 200 hours of continuous duty service. Adverse conditions such as extreme temperature, severe shock loading or corrosive environment may require special grease and/or greasing intervals.

Installation

1. Before assembly, mounting shafts for flanges, flange bores and flange faces should be thoroughly cleaned to guarantee positive contact at each surface.
2. Splined telescoping assemblies must never be disassembled to avoid misalignment and unbalance.
3. Shaft yokes must be aligned in phase. Check the match markings.
4. Where flanges are manufactured with an interference fit, heat flanges uniformly before assembling onto driving and driven shafts. Wait for the complete cooling of the flanges before assembly to universal joint shafting.
5. Check to insure flanges are securely fixed and centered on mating driving and driven shafts.
6. Check that universal joint shaft is proper length per min./max. requirements between shaft ends.
7. For fixed length shafts, one companion flange must be free to move to allow slight length variation due to temperature changes, etc.

8. Tighten flange bolts per specification. Refer to companion flange dimensional pages for correct value (bolt torque).

Note: Torque values based upon lightly oiled lubricated threads. Once components are properly seated, graduate up to final torque value.

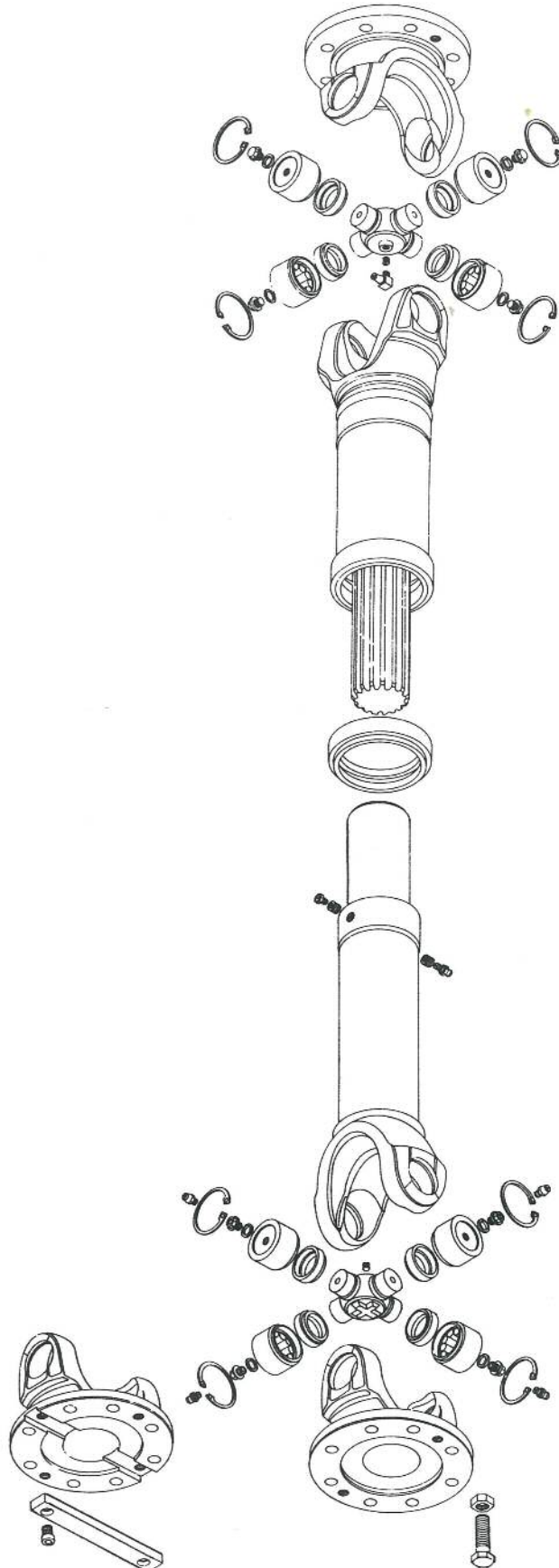
9. Where split cap bearings are utilized, bolts should also be checked for tightness.

10. To insure long life and trouble free operation, units should be regularly inspected to insure that bolts are tight, mating flanges are secure and lubrication seals and zerk fittings are intact.

11. Any unusual sound or vibration should be located and corrected immediately.

12. **WHEREVER PEOPLE OR EQUIPMENT CAN BE ENDANGERED BY ROTATING UNIVERSAL SHAFTS, SAFETY DEVICES MUST BE PROVIDED BY USER!**

NOTE: Flange Yokes available with split bearing caps.

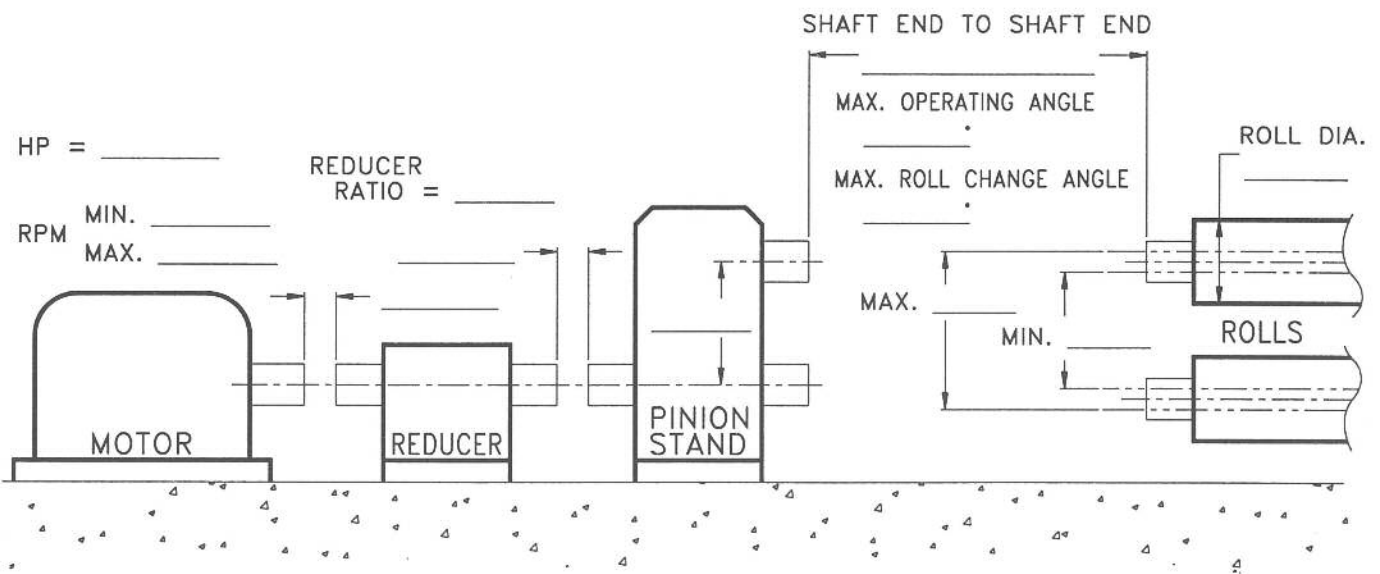


Application Data Sheet

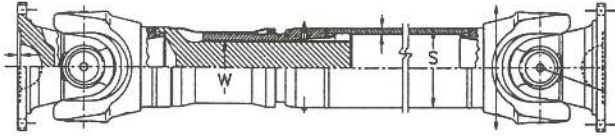
Please complete as applicable. Feel free to call us with any questions, concerns or additional details.

1. What is your application? _____
2. What kind of power source is driving the application?
 Electric Motor Turbine Internal Combustion Engine
3. What is the Horsepower? _____ 3a/What is RPM? _____
4. Is motor constant torque or does torque vary with speed?

5. What is peak overload torque of motor? _____
6. How many u-joint shafts will be powered by the motor? _____
7. If a gear reducer (or reducers) are utilized what is reduction ratio(s)? _____
8. What is the distance between output and input shafts? _____
9. What is the angular offset between shaft ends? _____
10. What is minimum centerline of pinion shafts? _____
11. What is minimum centerline of roll end shafts? _____
12. Is your application Continuous load Alternating Load
 Reversing Non Reversing
13. Describe any other essential/unique info about your application _____



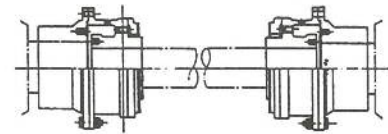
Johnson Power Universal Joint



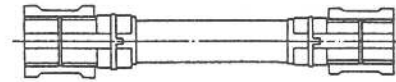
Advantages

- High Power Transmission Efficiency (power transmitted via rolling contact)
- Sealed Lubrication (loss of grease minimal)
- High Angular Capacity (as great as 35 deg. depending upon speed and angle)
- Long, Predictable Life (bearing construction provides means to calculate life)
- Reduction in Vibration & Noise (smooth operation)

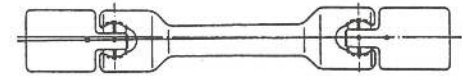
Other Couplings



Gear Coupling



Wobbler Coupling



Slipper Spindle

Disadvantages

- Extreme loss of efficiency as angularity increases (power transmitted via sliding contact)
- Limited Lubrication Seal (high loss of grease requiring continuous re-lubrication)
- Unpredictable life with high wear potential
- Higher Noise & Vibration levels

Johnson Power, Ltd., guarantees all products will leave its premises in good condition. Such products are warranted against defects in workmanship and materials for a period of 180 days after shipment.

Liability under this warranty shall extend only to (1) the replacement or correction of any defective component or product or (2) refund of the amount paid for the defective component or product, as determined by Johnson Power, Ltd., in Johnson Power, Ltd.'s sole and absolute discretion. All material must be returned freight prepaid, and there will only be an adjustment under this warranty following an inspection of the component or product at Johnson Power, Ltd. This warranty shall not apply to any product that has been repaired or altered without the knowledge and written consent of an authorized representative of Johnson Power, Ltd., or any component or product that has been operated where installed in a manner contrary to the instructions of Johnson Power, Ltd. or the manufacturer, or any component or product that has been subjected to misuse or improper maintenance or any product or component that has been damaged by accident or negligence.

THIS WARRANTY IS MADE IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO OTHER WARRANTIES THAT EXTEND BEYOND THIS EXPRESSED WARRANTY.

Rotating drive shafts and equipment are dangerous. Users must take appropriate safety precautions, including but not limited to, installation of proper safety guards. Johnson Power, Ltd. may provide certain guards or other equipment that may improve safety, but gives no warranty that any safety guards or other equipment it sells will ensure that such equipment is safe under any circumstances. It is the end-user's responsibility to ensure safety of persons coming in close proximity with these parts, and Johnson Power, Ltd. gives no instructions on appropriate safety standards for use of equipment it sells, except as otherwise required by law.



JOHNSON POWER LTD.

POWER THROUGH PERFORMANCE

2530 BRAGA DRIVE BROADVIEW, ILLINOIS 60155

PHONE: 708/345-4300 FAX: 708/345-4315