Tom Wood's

CUSTOM DRIVE SHAFTS

"The Best Drive Shafts In The World"

2003 Catalog

Over 15,000 Custom Drive Shaft Possibilities

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"The Best Drive Shafts In The World"
Ogden, Utah 84401

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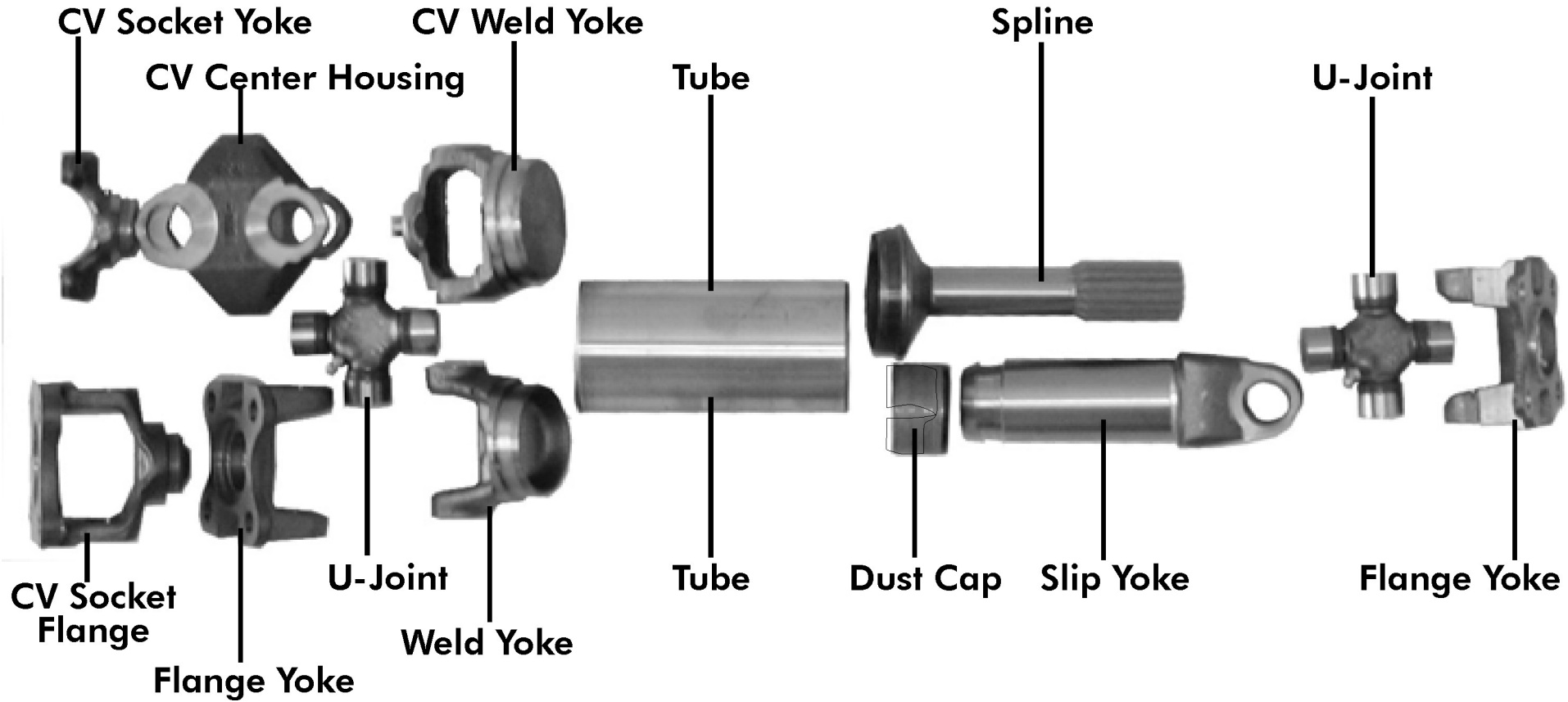


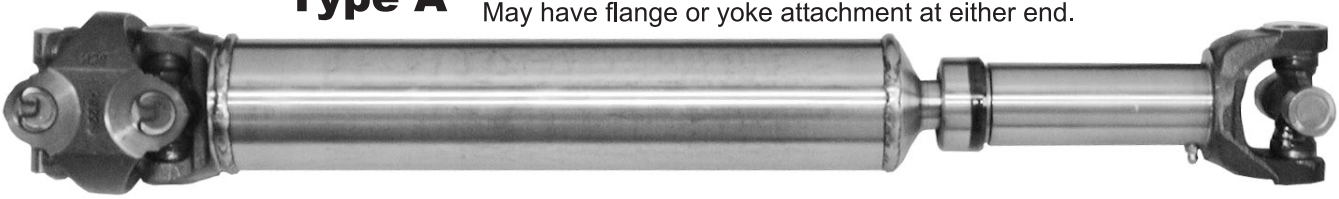
Complete Measuring Guide

How To Order Your Custom Drive Shaft
As Easy As 1-2-3

Step 1a:
Select The Type Of Drive Shaft.

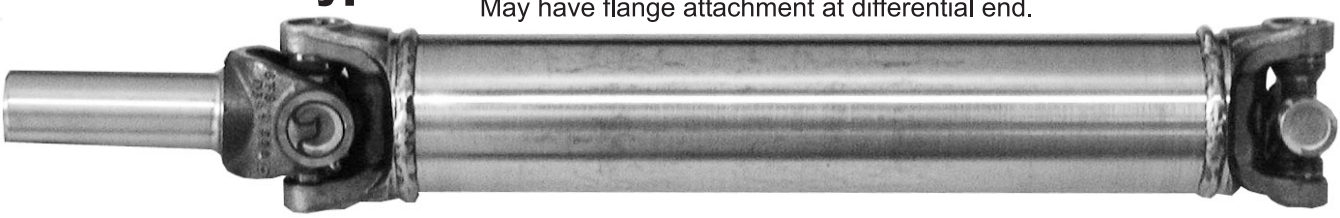
***Modified vehicles may require a different type than original.**

Type A
Double Cardon (CV)
May have flange or yoke attachment at either end.



Type B
Standard Slip - 2 Joint
May have flange or yoke attachment at either end.

Type C
Reverse Slip - 2 Joint
May have flange attachment at differential end.



Step 1b:
Select The Tube Diameter.

***Modified vehicles may require a different tube than original.**

You must consider the length of the drive shaft, expected speed in RPM (revolutions per minute) and obstructions that may limit tube diameter.

Most Stock Applications:
The original equipment diameter will be sufficient.

Non-Stock Applications:
Here are our general guidelines for the minimum tube diameter based on drive shaft length, center of joint to center of joint installed at an expected maximum operating speed of 3,000 RPM (revolutions per minute) or less. Larger tubes will allow for higher speed and in most cases greater strength, but may create clearance problems.

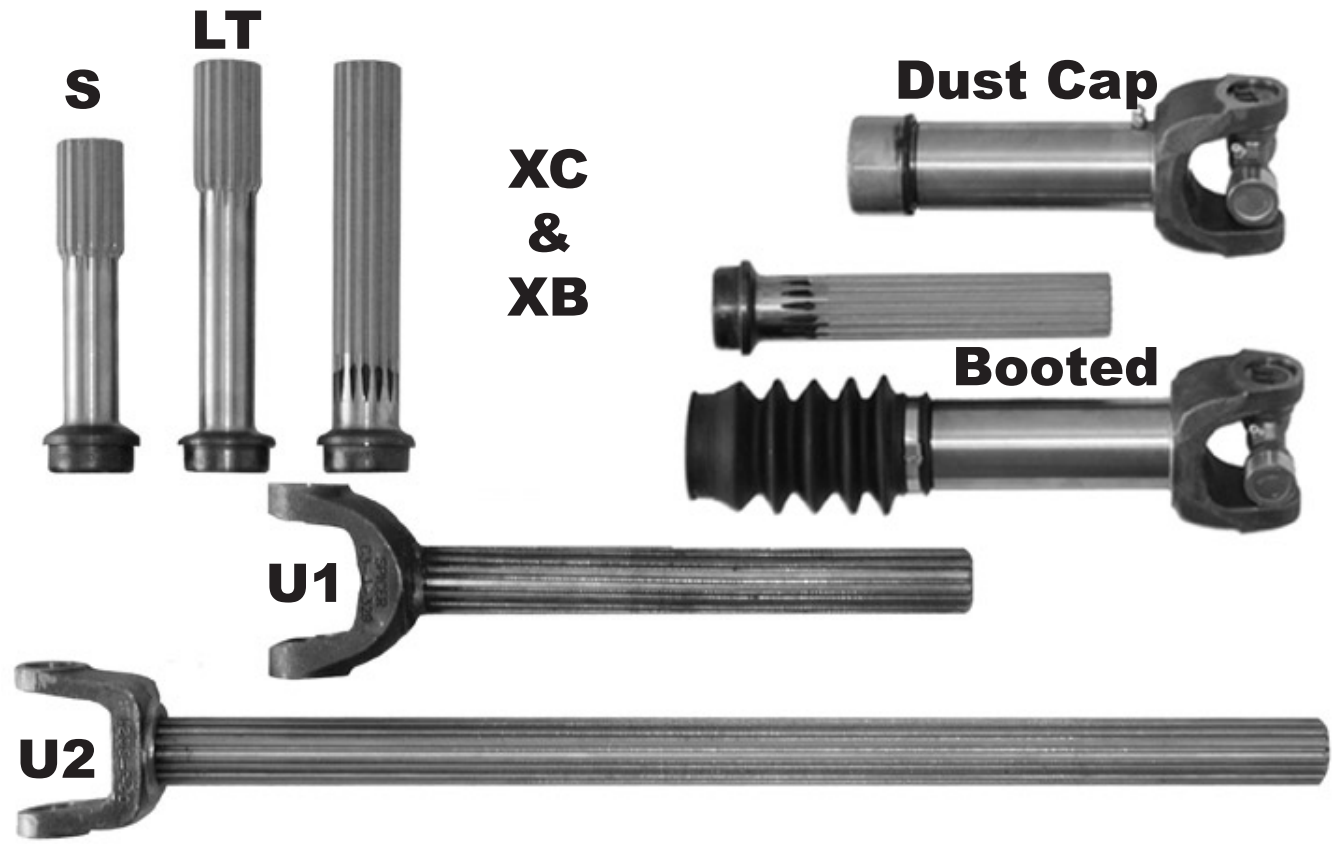
Tube Diameter	Drive Shaft Maximum Length
1.250"	35"
2.000"	45"
2.500"	50"
2.750"	55"
3.000"	60"
3.500"	70”

Step 1c:

Select The Spline Type For A & B Only.

***Modified vehicles may require a different spline than original.**

Splines are available for a variety of specialty purposes.



(S) Standard Spline:

Used on most original equipment applications and will generally allow for a useable stroke of 3” Can be used in all tube diameters and is the lowest priced.

(LT) Long Travel Spline:

Very similar to the (S) Standard Spline, but is 1” longer to allow for a useable stoke of about 4”. Can be used on 2”, 2.5”, 2.75”, 3”, & 3.5” diameter tubes.

(XB & XC) Extended Life Splines:

Advantages is a longer stroke than the (S) Standard Spline. The splines are cut for the full length of the stub. This yields more contact area between the slip yoke & spline stub that will net a longer life. Usable stroke is 4.5”. The XC comes with a dust cap and the XB comes with a boot. The XC can be used on 1.25” & 2”diameter tubes. The XB can be used on 2”diameter tubes.

(U1 & U2) Ultimate Travel Splines:

Specifically designed for applications such as shackle reversals in conjunction with revolver shackles or buggy springs. The U1 has a useable stoke of 8” and the U2 has a useable stroke up to 19”. **Not recommended for high-speed use**. Can be used in all tube diameters but is most suitable for 2” diameter tubes.

Step 2

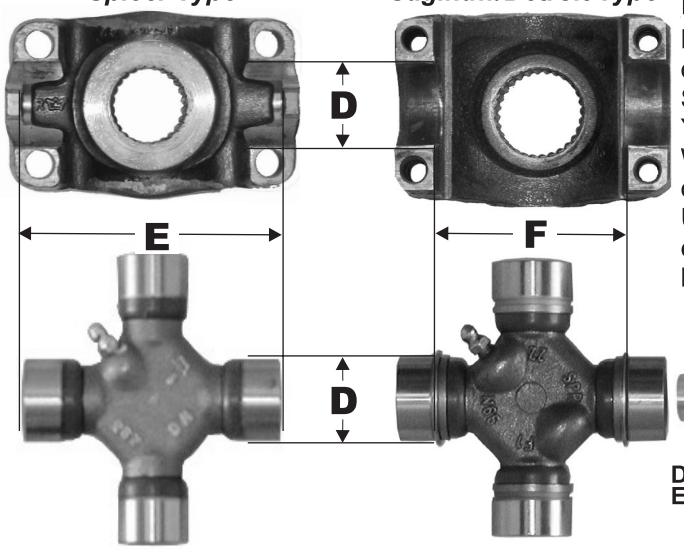
***Note: For the most accurate measurements please use a caliper.**

Determine The Attachment For Each End.

*This step may not be required for pure stock applications.

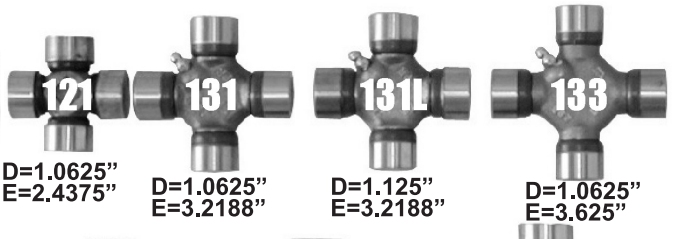
Choice #1 - End Yoke / U-Joint:

Spicer Type *Saginaw/Detroit Type*



How To Measure:

Measure the attaching yoke or U-Joint. Note the differences between yokes. Spicer has centering lugs. Saginaw or Detroit are broached flat on inside surface. Yoke dimensions D, E or F match D, E or F on U-Joint. With Spicer yokes/joints, dimension E equals the distance between centering lugs or the width across the U-Joint. On Saginaw or Detroit yokes/joints dimension F equals the inside span of the yoke or the distance between the snap rings outside edge.



D=1.0625” E=2.4375” | D=1.0625” E=3.2188” | D=1.125” E=3.2188” | D=1.0625” E=3.625”

D=1.125” E=3.625” | D=1.188” E=3.625” | D=1.188” E=4.188”

D=1.078” E=2.125” | D=1.125” E=2.625” | D=1.125” E=2.5625”

Universal Joint Selection

Universal joints are categorized by their method of retention (inside or outside snap rings) and their physical dimensions. These different sizes are generally referred to as their **SERIES** name.

It will almost always be necessary to confirm the universal joint series in order to properly build your drive shaft. In many custom applications there may be a possibility of increasing the universal joint size for greater strength.

Each series will also have a strength and life expectancy rating. The expected life rating will be assuming proper maintenance, a constant load and constant speed operating angle. Given all of these variables, life expectancy can be impossible to determine in any but the broadest range. **We suggest keeping the stock universal joint series on all but highly modified vehicles.** On modified vehicles it is best to select universal joint size for strength based on ultimate expected torque and the universal joints. Strength ratings for the following universal joints are shown in pound feet torque at a minimum elastic limit.

Series Strength LB/FT

1310----------1600
1330----------1800
1350----------2200
1410----------2800

If horsepower and drive shaft speed in RPM are known, torque can be calculated as follows:

TORQUE (FT/LB) = HP X 5252 / RPM

EXAMPLE: 100 HP X 5252 / 1500 RPM = 350 FT/LB torque

U-Joint Choices:

121 1210 SERIES U-JOINT
D=1.0625" E=2.4375"

131 1310 SERIES U-JOINT
D=1.0625" E=3.2188"

131L 1310 SERIES LARGE CAP
D=1.125" E=3.2188"

133 1330 SERIES U-JOINT
D=1.0625" E=3.625"

133L 1330 SERIES LARGE CAP
D=1.125" E=3.625"

135 1350 SERIES U-JOINT
D=1.188" E=3.625"

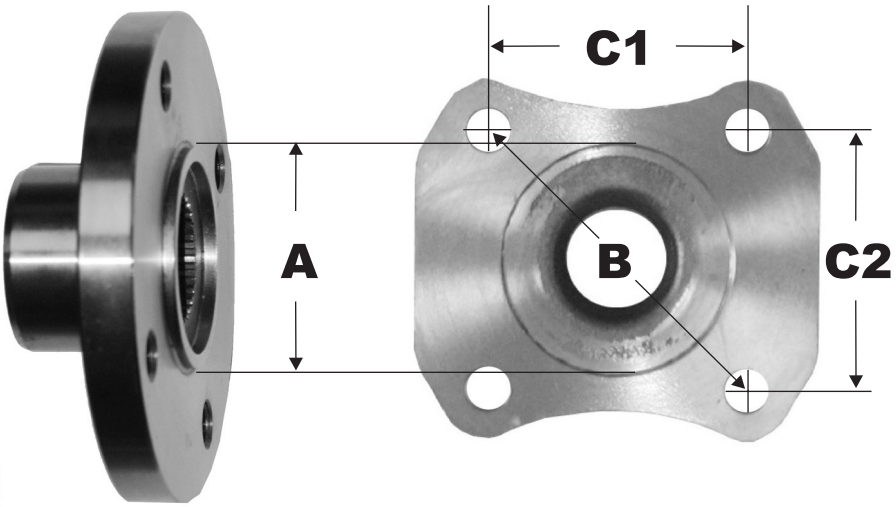
141 1410 SERIES U-JOINT
D=1.188" E=4.188"

3R 3R SERIES U-JOINT
D=1.125" F=2.5625"

726 7260 SERIES U-JOINT
D=1.078" F=2.125"

729 7290 SERIES U-JOINT
D=1.125" F=2.625"

Choice #2 - Flanges



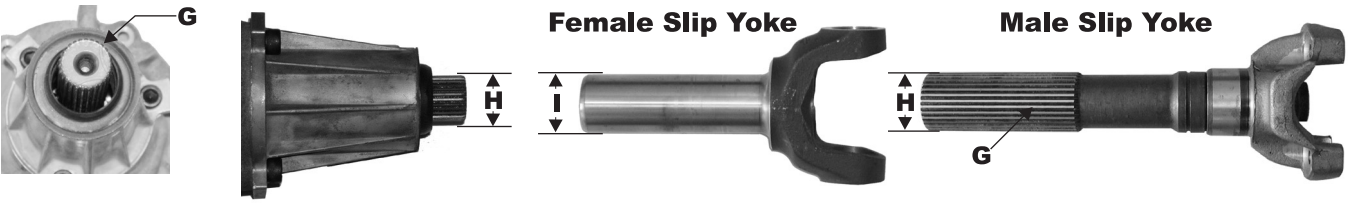
How To Measure:

Measure the pilot diameter dimension (A). Measure bolt circle diameter (B). Measure chord lengths (C1 & C2). Determine if bolt holes on the flange attached to the drive shaft are threaded or non-threaded.

Flange Choices:

F0	F0 FLANGE FOR 1210 SERIES U-JOINT	A=2"	B=3.5"	C=2.5"	
F1	F1 FLANGE FOR 1310 SERIES U-JOINT	A=2"	B=3.5"	C=2.5"	
F2	F2 FLANGE FOR 1310 SERIES U-JOINT	A=2"	B=4.25"	C=3"	
F3	F3 FLANGE FOR 1330 SERIES U-JOINT	A=2"	B=4.25"	C=3"	
F4	F4 FLANGE FOR 1350 SERIES U-JOINT	A=2"	B=4.25"	C=3"	
F5	F5 FLANGE FOR 1350 SERIES U-JOINT	A=2.688"	B=4.25"	C=3"	
F5T	F5 FLANGE FOR 1350 SERIES U-JOINT THREADED BOLT HOLES	A=2.688"	B=4.25"	C=3"	
F6	F6 FLANGE FOR 1350 SERIES U-JOINT	A=2.75"	B=3.75"	C1=2.875"	C2=2.406"
F7	F7 FLANGE FOR 1410 SERIES U-JOINT	A=2.75" B=3.75"		C1=2.875"	C2=2.406"
F8	F8 FLANGE FOR 1410 SERIES U-JOINT	A=2.688" B=4.25"		C=3"	
F8T	F8 FLANGE FOR 1410 SERIES U-JOINT THREADED BOLT HOLES	A=2.688" B=4.25"		C=3"	
DIN	LAND ROVER or EARLY JEEP FLANGE FOR 1310 SERIES U-JOINT	A=2.375"	B=3.125"	C1=2"	C2=2.375"
GM1	GM1 SAGINAW FLANGE FOR 3R SERIES U-JOINT	A=3.125"	B=4.25"	C=3"	
GM2	GM2 SAGINAW FLANGE FOR 1310 SERIES U-JOINT	A=3.125"	B=4.25"	C=3"	
GM3	GM3 SAGINAW FLANGE FOR 1330 SERIES U-JOINT	A=3.125"	B=4.25"	C=3"	
S1	SUZUKI 1ST DESIGN FLANGE	A=1.774"	B=3.13"	C1=2.225"	C2=2.225"
S2	SUZUKI 2ND DESIGN FLANGE	A=1.774"	B=3.35"	C1=2.375"	C2=2.375"
LC1	LAND CRUISER 1ST DESIGN 3 SPEED FLANGE FOR 1310 SERIES U-JOINT 10 MM BOLT HOLES	A=1.812"	B=3.375"	C1=2.225"	C2=2.55"
LC2	LAND CRUISER 2ND DESIGN 4 SPEED CV FLANGE FOR 1310 SERIES U-JOINT 11.5 MM BOLT HOLES	A=1.812"	B=3.575"	C1=2.71"	C2=2.375"
T1	TOYOTA TRUCK 1ST DESIGN FLANGE FOR 1310 SERIES U-JOINT 8MM HOLES	A=1.812"	B=3.35"	C1=2.225"	C2=2.52"
TA1	TOYOTA TRUCK 1ST DESIGN CV FLANGE FOR 1310 SERIES U-JOINT 8 MM HOLES	A=1.812"	B=3.58"	C1=2.75"	C2=2.375"
T2	TOYOTA TRUCK 2ND DESIGN FLANGE FOR 1310 SERIES U-JOINT 10MM HOLES	A=1.812"	B=3.35"	C=2.375"	
Ta2	TOYOTA TRUCK 2ND DESIGN CV FLANGE FOR 1310 SERIES U-JOINT 10MM HOLES	A=1.812"	B=3.58"	C1=2.725	C2=2.375"

Choice #3 - Reverse Slip



How To Measure:

On female slip yoke applications count the number Of teeth on the spline (G).. Measure the spline diameter (H) and seal surface diameter (I). On Male slip yoke applications count the number of teeth on the spline (G). Measure the spline diameter (H).

Slip Yokes:

27Z131	27 SPLINE SLIP YOKE FOR 1310 SERIES U-JOINT	G=27	H=1.172"	I=1.5
27Z131C	27 SPLINE CV SLIP YOKE FOR 1310 SERIES U-JOINT	G=27	H=1.172"	I=1.5
27Z133	27 SPLINE SLIP YOKE FOR 1330 SERIES U-JOINT	G=27	H=1.172"	I=1.5
27Z135	27 SPLINE SLIP YOKE FOR 1350 SERIES U-JOINT	G=27	H=1.172"	I=1.5
27Z3R	27 SPLINE SLIP YOKE FOR 3R SERIES U-JOINT	G=27	H=1.172"	I=1.5
31Z131	31 SPLINE SLIP YOKE FOR 1310 SERIES U-JOINT	G=31	H=1.390	I=1.886
31Z133	31 SPLINE SLIP YOKE FOR 1330 SERIES U-JOINT	G=31	H=1.390	I=1.886
31Z133C	31 SPLINE CV SLIP YOKE FOR 1330 SERIES U-JOINT	G=31	H=1.390	I=1.886
31Z135	31 SPLINE SLIP YOKE FOR 1350 SERIES U-JOINT	G=31	H=1.390	I=1.886
31Z135C	31 SPLINE CV SLIP YOKE FOR 1350 SERIES U-JOINT	G=31	H=1.390	I=1.886
32Z131	32 SPLINE SLIP YOKE FOR 1310 SERIES U-JOINT	G=32	H=1.378	I=1.875
32Z133	32 SPLINE SLIP YOKE FOR 1330 SERIES U-JOINT	G=32	H=1.378	I=1.875
32Z135	32 SPLINE SLIP YOKE FOR 1350 SERIES U-JOINT	G=32	H=1.378	I=1.875
32Z135C	32 SPLINE CV SLIP YOKE FOR 1350 SERIES U-JOINT	G=32	H=1.378	I=1.875
32Z141	32 SPLINE SLIP YOKE FOR 1410 SERIES U-JOINT	G=32	H=1.378	I=1.875
32Z3R	32 SPLINE SLIP YOKE FOR 3R SERIES U-JOINT	G=32	H=1.378	I=1.875
32Z3RC	32 SPLINE CV SLIP YOKE FOR 3R SERIES U-JOINT	G=32	H=1.378	I=1.875
32ZM131C	32 MALE SPLINE CV YOKE SHAFT FOR 1310 SERIES U-JOINT	G=32	H=1.378	
32ZM3R	32 MALE SPLINE YOKE SHAFT FOR 3R SERIES U-JOINT	G=32	H=1.378	

Step 3:

Determine The Proper Working Length.

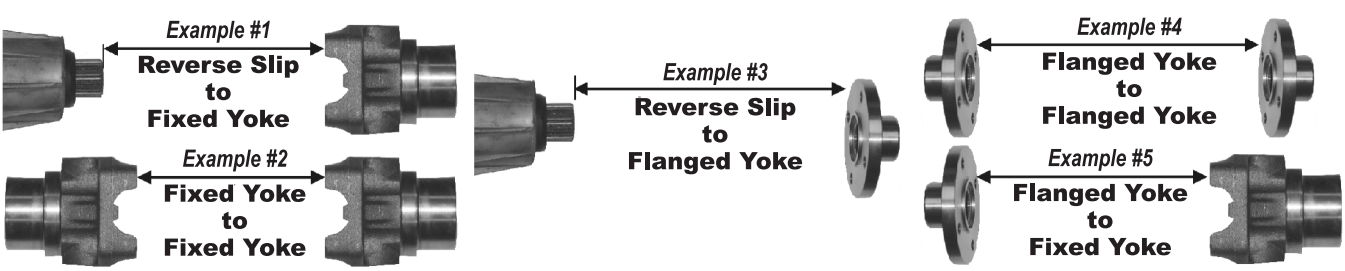
*Pick a drawing.

Standard Applications:

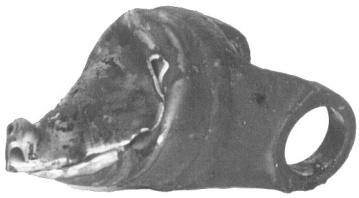
Measure with weight on the suspension.

Reverse Shackle, Revolver Shackle and Buggy Spring Applications:

Measure fully compressed and fully extended.

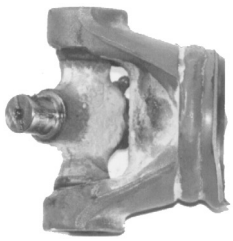


Drive Shaft Failures & Their Causes



Twisted Tube

This twisted, broken tube shows excessive load or undersized shaft. Stock tubes are usually very week.

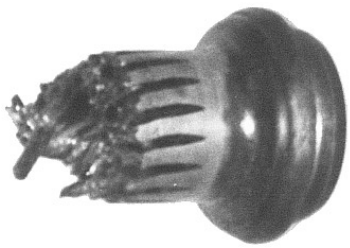


Sheared Tube

Here is a clean tear in a tube. This was caused by something rubbing on the shaft creating stress risers. When installing drive shaft make sure nothing will touch the tube through it's range of motion.

Broken Weld

This might have been caused by a defective weld or even by inconsistent properties in the tube. Welded to hot.



Broken Spline

This broken spline stub could have happened because of excessive load, fatigue failure, shock load or a defective part. Make sure the parts you use can stand up to the intended use.

Broken Weld Yoke

Excessive load or angle caused this broken bearing bore.
*See also damaged End Yoke.

Damaged End Yoke

Always inspect your attaching yokes for any nicks or gouges that will cause the bearing caps to mis-align.

Missing Weight

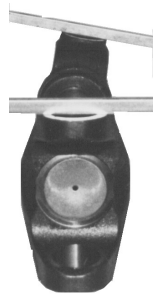
Balance weights will sometimes fall off. 1 oz. Of imbalance on a 1 in. Radius will create nearly 16 pounds of centrifugal force.

Circumferential Crack

To find a twisted tube like this, look for cracks in the paint or scaling of the surface oxide.

Dented Tube

Road hazards or tire lifts can injure your drive shaft. Once the damage is done replace the tube.



Phasing

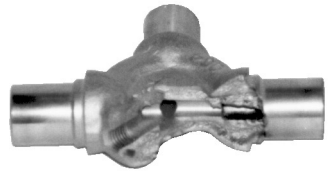
Phasing/exact alignment of the joints is important. This drive shaft is out of phase. Joints/yokes should remain parallel within 1.5 degrees.

Torsional Play

With the drive shaft removed check for excessive twisting play. Anything that can be felt is probably too much. This is also a good way to check fo excessive lateral play.

Burned U-Joint

This is almost always caused by a damaged attaching yoke or lack of lube.



Broken U-Joint

This is usually a result of excessive angles, shock load or poor quality.

Broken Stud

Excessive drive shaft angles caused this CV to bind and fail. Remember that Cv's bind at different points, the amount of articulation will vary between about 20 & 35 degrees.

Drive Shafts 101

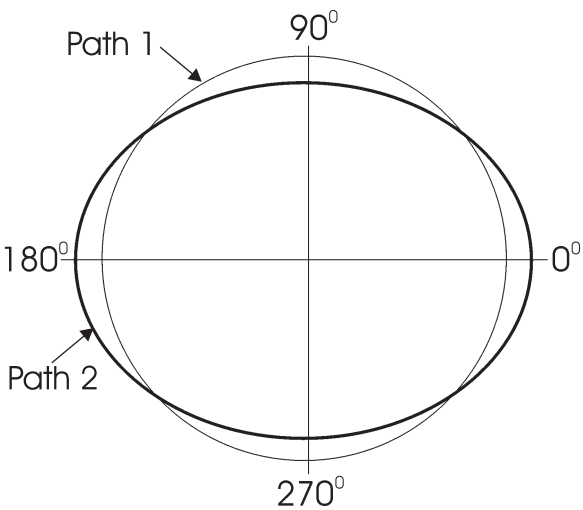
O.K. so now you've done it. You put a lift in your vehicle and changed the engine, transmission, transfer case, differential or any of the above. Now your go anywhere four wheel drive baby rides like a out of balance washing machine or now that you've got all that raw power & torque, you keep breaking your drive shaft. What do you do? The lift kit manufacturer may tell you one thing and the local drive line shop or mechanic will tell you another. You certainly haven't put this much time, effort and money into creating the ultimate 4X4 to live in fear of the possible catastrophic consequences which can come about (usually at the worst possible moment) from neglecting drive line considerations.

So what do you do? Who do you believe? Do you need larger U-joints? Do you need a C.V.? Quite frankly, only **YOU** can answer these questions. As like many of our problems in life, the questions can usually be solved, by arming yourself with information. Unfortunately for you, there is a lot of mis-information out there especially regarding proper U-joint angles. I hope to clear up a lot of this here. Please bear in mind we are not working with an exact science. Some of the time things that, in theory, should work do not and other times people seem to be happy with a drive-line that by all standards should cause a horrible vibration or short life. Your chances for success are greater if you do your homework and design around established principles.

Our opinions and recommendations are based on numerous sources of information and twenty plus years of personal experience. By no means, do I know all there is to know about drive lines (or any thing else). The intent here is to give broad general information, realizing, that for the most part, we are dealing with highly modified vehicles, requiring other than factory approved solutions.

In addition to a straight and properly balanced drive shaft, proper geometry is the most important design factor to consider when smoothness of operation, ultimate strength and long life are desired. If you are like us, rather than relying on just what someone may tell you. You tend to believe something more readily if you have a basic understanding of the principles involved. It is very important that you understand the concept of non-uniform velocity of your drive shaft caused the U- joints working through an angle.

If you were to watch a U-joint move through an angle (the operating angle) from an end view . You would see that the U-joint in the drive shaft has to move through an ellipse. Because the U-joint has to move through each of the quadrants of this elliptical path in a fixed amount of time, the velocity or surface speed of the drive shaft increases & decreases 2 times per revolution.

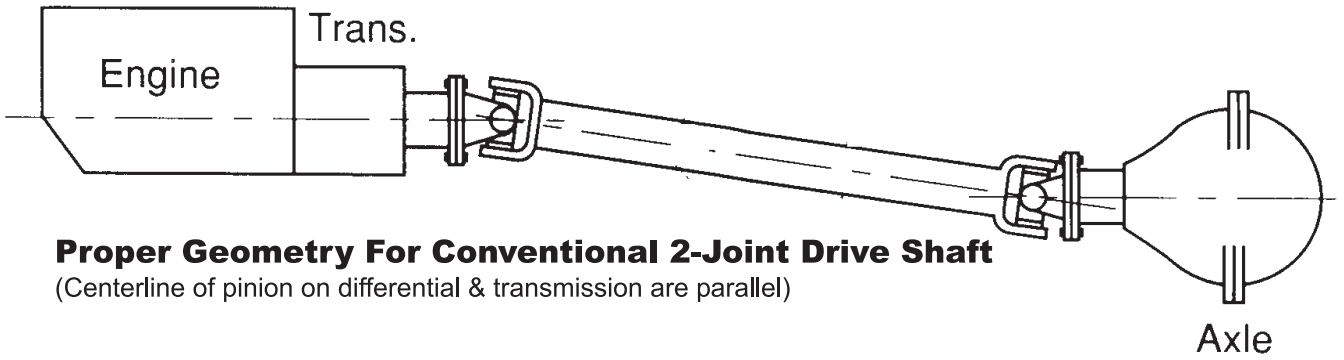


With a conventional two joint drive shaft, if your second U-joint has an equal or intersecting angle, the second U-joint will be decelerating at the same time and at very near the same rate that the first U-joint is accelerating, resulting in a smooth power flow through to your pinion.

We hope you noticed we stated "very near" when describing this cancellation of non-uniform velocities. This is because the rates of acceleration and deceleration, minimum and maximum velocity, are NOT reciprocal numbers. Min./Max. velocities are a function of the cosine of the operating angle. For example; to make the numbers easy, the cosine of the angle were 90 degrees and the velocity on the drive shaft were 100 F.P.S. the min. velocity would be 90 F.P.S. and the max

111 F.P.S. It is for this reason, that on your drivel shaft, there is an upper limit to how steep you can run a drive shaft. Even with equal or intersecting angles.

How steep can you run a drive shaft? This is entirely up to you. However, most manufacturersrecommend a maximum of 7 degrees. we believe they are conservative (they have to be). we also think they base their

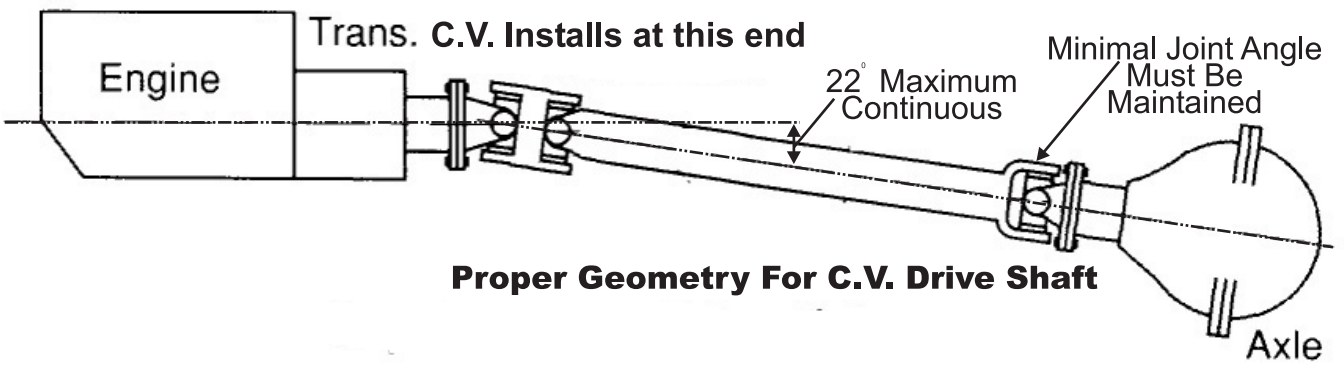


Proper Geometry For Conventional 2-Joint Drive Shaft
(Centerline of pinion on differential & transmission are parallel)

recommendations on the math for the largest semi-sized drive shaft and call it good for every thing else (which it would be). Doing the math for an automotive sized drive shaft, using a 4" swing diameter and assuming the transfer case output and pinion shafts are parallel, the actual cosine for an angle of 15 degrees. We calculate the result of the net difference in linear distance traveled through the arc of each of the U-joints' path, to be roughly .0014" per occurrence. We believe there are enough clearances in the universal joint, the slip yoke & spline stub along with a torsional modulus of elasticity in the tubing and other components to accommodate this. Beyond this point the power train components must themselves flex and distort to allow for this extra motion. This repetitive and continuous flexing will fatigue these components and cause premature failure.

There are other factors to consider though. Beginning with what you are willing to live with. Bear in mind that with a drive shaft pushed to this 15 degree limit you may notice a slight (slight can be a matter of definition) vibration on smooth highway at about 45-50 M.P.H. when you flutter the gas just right. Most people can live with this. When in doubt or if you are near this upper limit, we recommend that you install a double cardan (C.V.) type drive shaft.

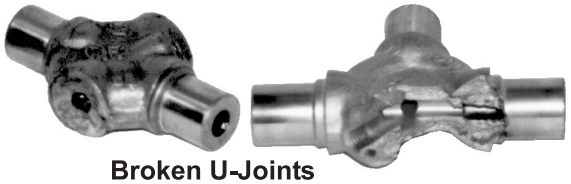
Remember that the geometry you need to maintain is different from that of a conventional 2-joint drive line. The cost differential is minimal and the performance/life gain will pay for itself in the long run.



Proper Geometry For C.V. Drive Shaft

Another factor, seldom considered, is the vibrations which will be caused by the forces required for acceleration & deceleration of the mass of your drive shaft. A drive shaft, which is too heavy and /or having a radius which is too large along with running through a steep angle, can accentuate a problem here.

You also need to know your U-joint life expectancy. Basically a U- joint is rated for specific, continuous operating load @ 3000 R.P.M. for 5000 hrs. with a 3 degree joint angle, and assuming proper periodic maintenance. If you double the angle you halve the life, halve the load & double the life and vice/versa. Where your drive shaft seldom sees a constant load, U- joint life becomes a difficult number to crunch. While 5000 hrs. may not seem like much it's roughly equal to driving 8 hours a day, 5 days a week for 2 ½ years. So 20% of life expectancy may not be such a bad number after all.



Broken U-Joints

Most drive shafts will, depending on components used, incur a binding interference at about 30 degrees. You **DO NOT, we repeat DO NOT** want to run a drive shaft at any where near this angle. you need to allow for axle droop, frame flexing and differential roll. All of which can momentarily alter the operating angle of the U- joint to the point that it will cause what we refer

to as an **IMMEDIATE & CATASTROPHIC FAILURE**. Ultimately you need to be certain that your drive shaft will rotate freely under full axle droop.

It is also very important that you consider the upward pinion movement, caused by spring wrap, on the differential under high torque situations. You can usually get a pretty good idea of how much the differential will roll up with the following simple test: 1-Make certain that all of your power train is in good working order. 2-Stand a safe distance to the side of the vehicle where you can watch the motion of the differential. 3-Have a partner set the park/emergency brake 4-Start the vehicle. 5- Put transfer-case in low range, the transmission in 1st. gear and accelerate the engine moderately. I think it may well surprise you how much spring wrap you actually have. Again it may be necessary to do something to control the upward motion of the pinion to prevent drive shaft binding and that big CRUNCH/SNAP which often occurs in high torque situations.

Many people mistakenly believe that a double cardan or C.V. type drive shaft will allow for greater operating angles than a conventional 2 joint or single cardan drive shaft. This is not true. Some types of C.V.'s will actually incur a binding interference at less of an angle than a standard two joint drive line, again depending on the individual components used. Additionally the C.V. itself is longer than more conventional components and will create a greater operating angle on the drive shaft, especially on very short shafts.

The real benefit to a C. V. (double cardan) drive shaft is smoother operation at higher operating angles and longer life. The C.V. assembly works by intersecting the joint angles at the center pivot point and delivering a smooth rotational power flow or surface velocity through the drive line. Therefore, with this type of drivelshaft it is important to roll the differential upward so that you have minimal joint operating angle at the differential end. As any substantial joint angle would cause the pinion to try to speed up & slow down two times per revolution. Causing what is known as a torsional vibration. (Torsional vibrations will also be created in a 2 joint drive shaft that has unequal angles at each of the "U" joints). Rolling the differential upward will lessen the total operating angle at each end of the drive shaft. Now at the transfer case end of the drive shaft you have two joints equally dividing the total angle . This will double the life of the joints at this end, additionally you will be back up to full rated life for the joint at the differential end.

We also believe a C.V. is stronger than a conventional drive shaft when turning through the same angle. This would be the result of transmitting the torque in a plane more perpendicular to centerline of the drive shaft.

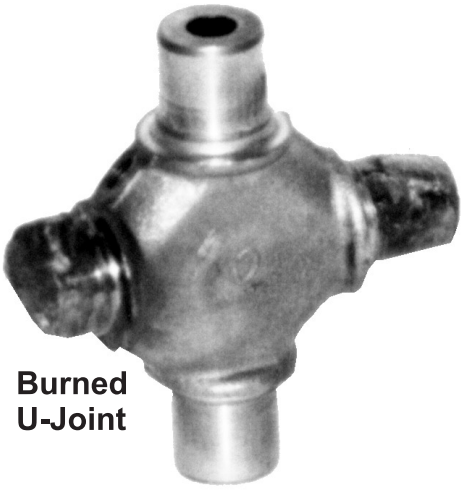
One word of caution though, make sure the pinion tail bearing still receives adequate oil . An overfill may be required, overfilling the differential may cause a problem with foaming of the differential fluid. Adding about a cup of a Dextron type II automatic transmission fluid to your gear oil will lower the surface tension of the oil and should help control the foaming. While this rolling of the differential is easily done with the rear, front ends create a different problem. Unless you are willing to cut the differential housing away from the tubes and reweld, anything you do to correct for drive shaft angles up front will adversely effect the steering geometry of your vehicle. Most people do just what is done in the factory every day. They make some kind of a compromise, get things as right as possible for the high speed rear shaft and live with less than ideal performance from the generally lower speed less used front shaft.

You know enough to determine which type of drive shaft you need for your particular application. You will want to size it properly for the expected load. Again, you will need to do some homework. How much does your vehicle weigh? What gear ratios do you have? How about your driving habits? How much break away torque is required for wheel slip? What transfer-case and differential do you have? Would you really rather break a transfer-case, axle or pinion shaft before the U- joint?

Many people call or write telling us about their 600 h.p. engine and to ask me to determine the proper U-joint or size of drive shaft for their application. The truth of the matter is; that this much horsepower, if delivered through the power train at a low R.P.M., would require the same sized drive shaft as used in a 18 wheel semi tractor rig, while if delivered at 5000 R.P.M. The stock joint in a C.J. could easily handle it. U-joints and other drive shaft related components are rated by torque. With horsepower as a constant, torque and speed are inseparably related and inversely proportional . Torque is what you need to be concerned with. Consider if you will the relatively low H.P. winch motor that delivers 9000 lbs. or more in pulling power, but your V6 engine would have a very difficult time pulling a trailer of equal weight at a high speed. Many engines are rated for peak H.P. at an absurdly high R.P.M. which is seldom seen in a real world situation.

Torque = HPX5252
(FT. LBS.) RPM

There are many situations that will cause U-joint or other parts to break, which are not caused by under-sized components. One of the most common is just plain poor quality. There are many differences from brand to brand, among them are; 1-The quality and alloy of the steel used. 2- Cast or forged?, 3-Design, 4-Machine tolerances held 5-Sheer bulk.



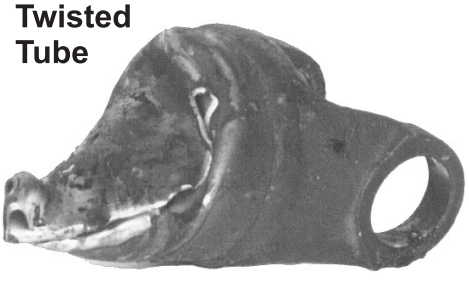
Burned U-Joint

Other possible causes for U- joints breaking could be shock load (If you're going up a hill and your wheels start to slip, is your solution to put the pedal to the metal?). Most fractures are the result of high stress impact loads or binding interference's caused by excessive/uncontrolled differential roll or droop. Quite often I see joints which fail in one direction only. Usually, if the joint is of good quality which allows for proper greasing, the problem is caused by a damaged or mis-aligned attaching yoke.

If you have a problem with repetitive premature wear out of your joints look for this. If you install a good joint in a damaged or mis-aligned yoke the needle bearings will not make full contact across the trunnion. This will crush the bearings and if allowed to progress will actually cause the U-joint to over heat and melt down. This type of failure can be extremely hazardous and costly especially if it occurs at a high speed. A simple check for this type of problem is to install a U- joint of known good quality into the suspect part and turn the joint by hand through its range of motion to check that the joint moves freely with no rough spots. My rule on questionable parts is; "When in doubt, throw it out". After all the part is cheap when compared to the cost of a breakdown, which can cause even more damage to your rig.

Twisted tubes are another common problem. Greater strength can be obtained in many ways. among them are: larger diameters, heavier wall thickness and better quality. The factors to consider when selecting tube size and type are: length, speed / R.P.M. straightness and strength required. The most common types of tubing available are cold rolled electric welded (C.R.E.W.), drawn over mandrel (D.O.M.), and to a lesser degree the much hyped chrome molly. Factory drive shafts are built using a C.R.E.W. This type of tube is made through a process of using flat sheets of steel, running it through a series of rollers to form the tubular shape and electric welding the seam. D.O.M. tube is initially made the same way with an additional step of drawing the tube over a die or mandrel. This step is a lot like a cold forging process which serves to make the tube much straighter, rounder, stress relieved and stronger. Although it appears to be, D.O.M. tube is not a true seamless tube. Seamless tube is generally made in very heavy wall thickness and is usually used for hydraulic applications. Chrome molly tube is an alloy tube and also made with a very heavy wall thickness. The down side to using a tube of an exceptionally heavy wall thickness is as outlined previously, The acceleration and deceleration of mass along with the excessive radial load placed on the adjoining support bearings. Also the construction methods require either turning down the insert diameters of the attaching components or enlarging the inside diameter of the tube to accept off the shelf components. Machining the I.D. of the tube will leave a weak point where thin material meets thick. The net gain in yield & tensile strength from D.O.M. to chrome molly is very minor.

Twisted Tube



In order to select the proper tube size you need to know the length of the finished drive shaft, expected speed/ R.P.M., torque requirements and allowable clearances. Because of something known as the critical speed drive shafts are built on different sized tubes. If you were to support a length of any shafting or tube at the ends, you would find that, the shaft or tube will flex in the center. This flexing will increase at greater lengths and higher speeds because of the radial forces applied from minor unbalance, reaching point to which vibrations will become uncontrollable and finally the ultimate destruction of the drive shaft at critical speed. Larger diameter tubes may be used to span greater lengths and/or to run at higher R.P.M. However, torque is also a factor in determining critical speed. In theory at least, with enough torque critical speed can be reduced to zero. Although this critical speed at zero R.P.M. would seldom be a factor in a normal four wheel drive application.

In summary; for a custom application, **You need to know the answers the questions of angles, torque, length, R.P.M., life expectancy and how smooth you expect your ride to be while traveling down the highway.**

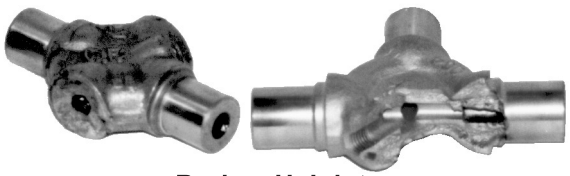
If you understand and apply the concepts that we've attempted to convey here and do your homework. You should be able to specify the size and type of drive line you may require as well as anybody and better than most. Please, at least give serious consideration to all of the factors involved when doing any vehicle modification. Rather than just the obvious end result of more lift, bigger engine etc. After all it really is a lot less expensive to do the job right the first time.

Drive Shaft Maintenance

It is important to make sure that the drive shaft in your vehicle is in sound working order. This is for your own safety and comfort, as well as for the safety of the guy following you (at a nice safe distance of 15 feet) down the freeway at 70 MPH. It certainly is no fun to have your weekend outing or the trip to the corner market interrupted with a drive shaft failure that can be an inconvenience at best or deadly at worst!

Drive shaft and U- joint failures can be attributed to one, or a combination of a few limited factors. Those factors are maintenance, driver abuse, external damage, Improper installation, poor drive line geometry, or quality and strength of components.

On stock applications, poor maintenance is the number one killer of drive shafts. Unfortunately for us, most domestic stock drive shafts have little or no provision for lubrication. The vehicle manufacturers are saving a couple of bucks per vehicle by not putting grease fittings on the wearing components. Because of this, there is not much that can be done to prevent a stock drive shaft from wearing out. We can give the drive shaft a quick visual checkup to ensure our safety, though. It doesn't take much time and will never hurt to check things out any time you're under the vehicle.



Broken U-Joints

Inspection of the drive shaft will require the vehicle's transmission or transfer case to be placed into neutral. Be sure to set the parking brake. This is important because if there is any pressure on the drive shaft, you will not be able to detect the minimal clearances that will be the first indicators of an impending problem.

Try twisting each of the yokes that attach to the U joint in opposite directions and attempt to move them side to side, checking for movement independent of the U joints. If you have any detectable play, in any direction, you have too much.

Check the slip yoke & spline stub for excessive lateral play. A general recommendation is to allow no more than .007". If you have a dial indicator and a vice, this is an easy at-home check to perform. The wear pattern left by the dust cap of the slip yoke on the spline stub will usually be a good indicator of whether the shaft is running in the proper position and the extent of travel from compression to extension.

Many times you can have a U joint that is beginning to seize up and you'll not be able to observe any play in the joint. When this happens, you may be able to see a rusty oxidization on the U joint around the bearing cap seals. You might also be able to hear a squeaking noise while driving the vehicle that will start out slow and cycle faster as the vehicle moves faster. The squeaking may also disappear at a high speed.Check to make sure the U bolts or strap and bolts are tight. Look also to see that the bearing caps have retained a tight fit into their respective yokes on the drive shaft. A cap that has lost its press fit will typically have a clean, polished area on the end from spinning in the bore of the yoke.

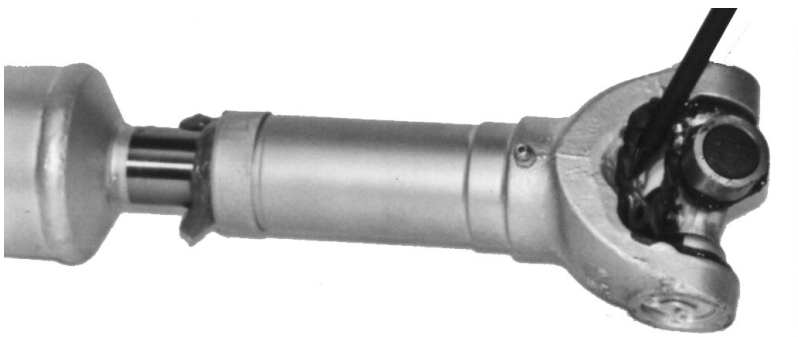
This is also a good time to look for things like a dented or twisted tube, missing balance weights, crud on the drive shaft and anything else that could cause a vibration problem.

Now, you'll want to check the attaching yokes. Are they securely attached to the transfer case or differential? Often, the nut on either of these yokes will begin to back off. If this is the case, you will be able to see the yoke move independently of the output shaft or the pinion shaft. Be careful in your diagnosis here, though, as the symptoms may be a result of bearing wear. To arbitrarily tighten the nut will usually accelerate the failure of a worn bearing. If you discover the yoke is loose, it may be a good time to drain the gearbox for a thorough inspection of the oil to look for excessive metal contamination. In the event of a

If you are lucky enough to have grease fittings in your U joints, use them! You should always grease until you see clean grease coming out of all four of the seals on the Universal joint. It is an urban myth that this purging will damage the seal. They are designed to purge. I recommend that you do this every time you change your oil and when you get back from that wet, muddy four- wheeling adventure. You'll be flushing the water and grit out of the bearings.

Other than that, there may be a grease fitting on the slip yoke (female sliding component) of the drive shaft. The slip yoke and spline stub are a couple of the more expensive components in a drive shaft. We don't believe that you can ever grease it too much (the EPA may disagree) and grease is a lot cheaper than finish-machined steel parts.

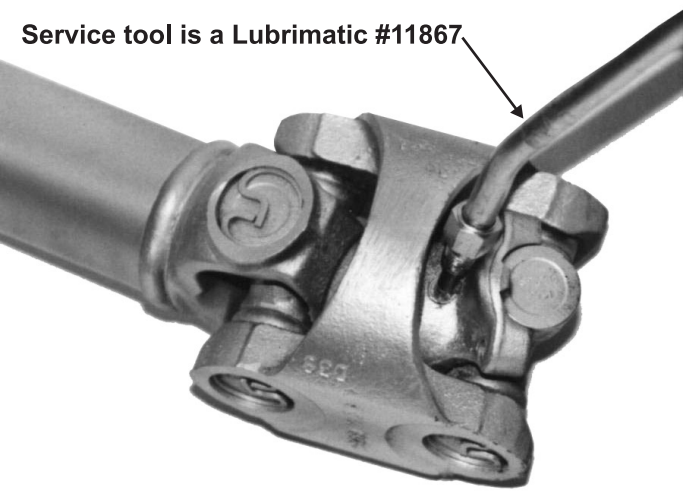
Proper greasing of the slip yoke will depend on the location of the grease fitting. On most older applications, the grease fitting is in the body of the slip yoke near the area that accepts the U joint. On many newer applications or reworked drive shafts, the grease fitting is in the dust cap at the end opposite the U joint (on either type of slip yoke you will find a relief hole in a plug that is in the end of the yoke under the U joint).



With the first type you need to put your finger over this hole and pump grease until you see clean grease coming out past the dust cap on the opposite end. Unless you do this, grease will simply fill the cavity in the slip yoke that is not filled with the spline stub and any excess will come out of the relief hole. With the second type, pump grease until you see clean grease coming out this relief hole. The object here is to make sure that clean grease will completely coat the wearing areas of the slip yoke and spline stub.

Regular performance of this procedure is especially important on the front drive shaft. That is because every time you hit a bump in the road, your drive shaft will compress and extend. This is a lot like a sawing motion. On your rear shaft the drive shaft is always turning and circulating the grease around. But on the front shaft, because it is seldom used at high speed, this sawing motion will wipe out the grease film, allowing for metal to metal contact and accelerated wear as compared to the rear shaft. Many people complain to drive line shops of the short life of their front drive shaft even though they "hardly ever use four-wheel drive."

Hardly ever using four-wheel drive is, in fact, a big part of the problem. We suggest that you periodically engage the front hubs or put the transfer case into four-wheel drive mode without the hubs engaged and drive for about 30 minutes at a relatively high speed. By doing this on a regular basis, you should also be able to notice any problems that may be in their infancy on the front shaft.



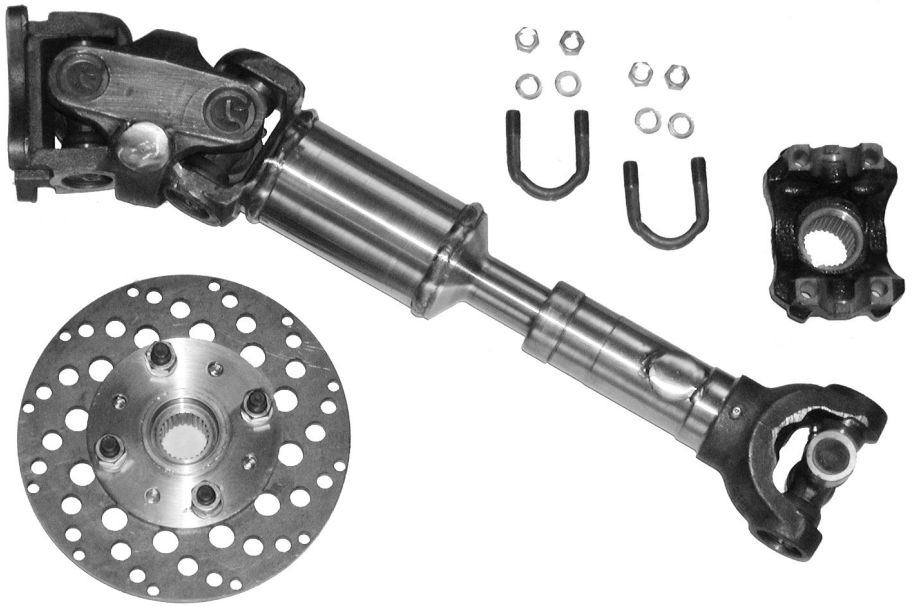
On a Spicer type of C.V. drive shaft, there will usually be a flush type grease fitting for lubrication of the center pivot point. The problem is, when the C.V. is opened where it would be accessible, this fitting is at the top of the shaft where you can't see it. If you turn the shaft until the fitting is at the bottom, the knuckle closes up and you can't get to it. The only viable solution I know of is to disconnect the drive shaft at the transfer case end, drop it down and grease it then. This should be done at least twice a year.

Of course, most of us use our vehicles for much more than the occasional trip to the ski lodge. We continually build problems into our vehicle while trying to improve its performance in other areas. Taller tires, differential changes, higher horsepower engines, suspension lifts and transmission swaps will all effect the life of the U joints and drive shaft. With many of these modifications, there is no "factory approved" solution.

Suspension lifts are probably the single biggest factor in unacceptable drive shaft and U joint life or performance. Most lift kits only address the issue of elevation. The truth is, most suspension lifts adversely effect proper drive line geometry especially on short wheelbase vehicles. We need that lift, though, to upgrade our suspension and to get the clearance required to accommodate taller tires. Please refer to geometry 101 To insure that your drive train is properly designed around allowable parameters.

CV Drive Shafts - 1350 vs 1310
Strength vs Flexibility

Many people have expressed an interest in the 1350 series CV (double cardan) type drive shafts. There seem to be a number of misconceptions out there about this type of drive shaft. As with any other products there are upsides and downsides to the 1350 series CV drive shaft.



Strength

I have seen another web site touting the 1350 CV to be three times the strength of the 1310 series. This, I believe to be incorrect. Relying on information provided by the manufacturer of the components, my calculation is that the 1350 series joint is about 37.5% stronger than the 1310 series. The 1350 joint is rated for 2,200 pound feet (minimum elastic limit) of torque. While the 1310 series (stock size for most Jeeps) is rated for 1,600 lb/ft torque. The center pivot pin on the weld yoke is the same size (.500"diameter) on both. An informal survey of the participants at a few of the rock crawling events revealed to us that most of the vehicles are running the 1310 series joints.

Flexibility & Durability

With unmodified components the 1350 series CV will flex to about 20 + degrees before it will incur a binding interference. The 1310 series will flex to about 30 degrees before experiencing the bind. With either size of shaft there are a few things that can be done to increase their flexibility to about 35 degrees. In order to build a high angle 1350 series CV drive shaft, the first thing that has to be done is to remove the outer sealing element on the CV Weld yoke this will then allow the CV to flex to a little more than 30 degrees. Beyond that then you must remove the sealing element at the center pivot point of the CV (see pictures). By doing this we can obtain about 35 degrees of flexibility.

It is important to note that the 1350 series CV is non-serviceable for maintenance purposes. The center pivot ball is greased prior to assembly with no provision for re-lubrication after. Although the flange can be drilled & tapped for a grease fitting, we believe this would risk causing a premature failure due to the uncertainty of removing all of the of metal fragments created during this procedure.

Removal of the sealing elements would most surely allow for premature wear and failure of this portion of the drive shaft. It is not suggested that this be done to any drive shaft that will see an appreciable amount of highway miles.
In order to make the 1310 series flex to the 35 degrees, there are a few selected locations that will require some relief grinding. Along with the use of an after market center housing. The after market housing will be made from a lighter casting than a genuine Spicer brand housing and therefore you will compromise a little bit of strength. Modifying the 1310 series CV to flex to 35 degrees allows for the sealing elements to remain intact. Additionally the center pivot point on the yoke type of 1310 CV will have the grease fitting, allowing for periodic re-lubrication.

For either type of drive shaft it is recommended that continuous operating angle of the drive shaft be at no greater than about 22 degrees in relation to the out-put of the transfer case. This is because of the increased sliding contact between the pivot ball and the mating babbitt seat.

Cost & Adaptability

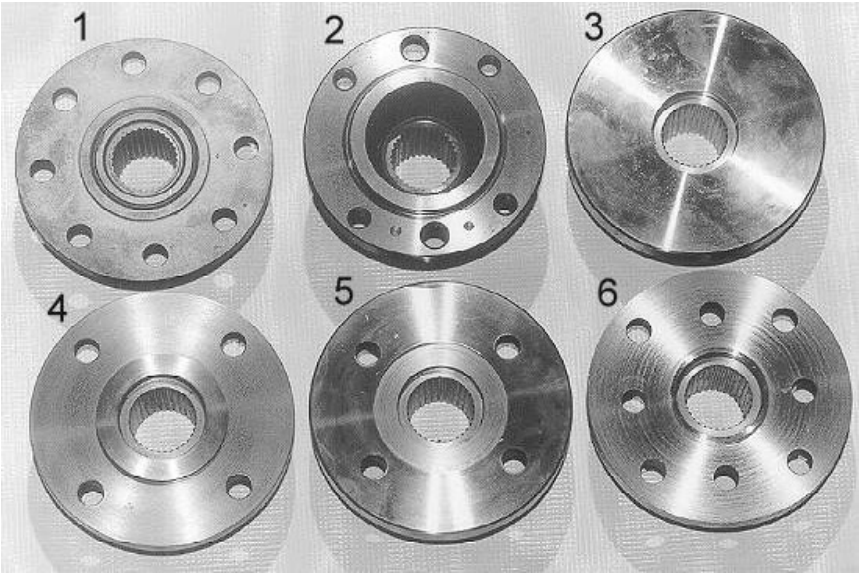
A 1310 series CV drive shaft (typical application) will have a base price of $265. With modifications for longer than stock splines and the grind work done for extra flexibility you could plan on spending closer to $345.

You may also need to purchase a new out-put yoke for the transfer case. If so, budget another $60 to $90 for this depending on application.

The 1350 series drive shaft would have a base cost of $375. The machine & grind work, if needed, for extra flexibility would add another $70.

You may also need to purchase a new out-put flange for the transfer case. If so, we have these in stock and available for the 26 spline (fits the following transfer cases; Dana 20 & 300, New Venture 207, 231 & 242, and the Atlas transfer case with 26 spline front output). However, when mated against a 26 spline shaft, we would consider the 1350 series drive shaft to be severely over rated for strength.

We are also making a 32 spline output flange that we finish machine to a number of different flange patterns. This flange will mate to the: 1-New Process 203 or 205 transfer case. 2-Any of the heavy duty (Advance Adapters, JB conversions, Tera Mfg., etc) slip yoke eliminators or fixed yoke conversions



for the New Venture 231 transfer case. 3-Atlas transfer case with the 32 spline front or rear out-put shafts

We now sell this 32 spline multi-bolt flange for $85.

1-Originally, the 32 spline output flanges were made for Ford applications. These were available in 32 spline only and have 8 bolt holes with a 1.875" seal surface. Because of the 8 bolt holes, they weren't readily modifiable for other applications.

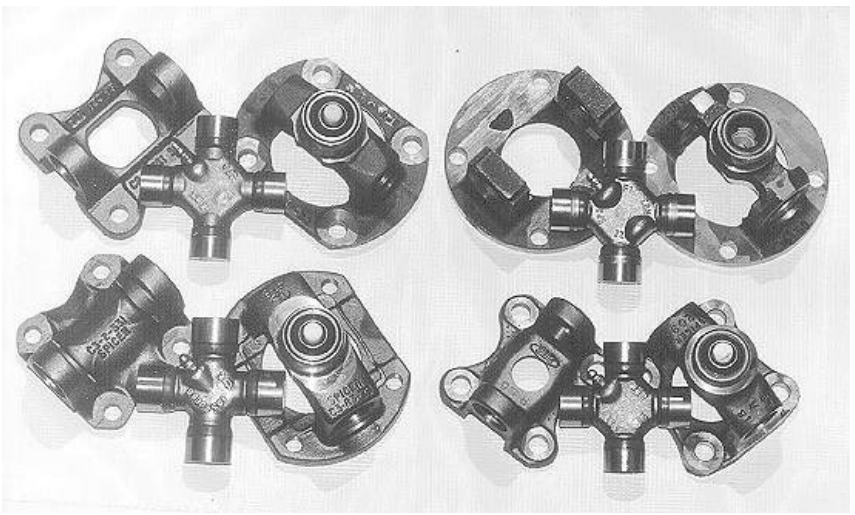
2-Among others, General Motors had a very similar flange. 4 bolts holes were in the correct location for a 1350 series CV. The pilot in the center required a little machine work. They are available in 26, 30 and 32 spline configuration.

3-We have invested the time and money into having a blank flange made with 32 splines and a 2.125" seal surface. This allows us to accurately finish the flange, in house, to a wide variety of configurations.

4-1350 series CV with a 2.687" pilot.

5-1410 series non-CV.

6-This flange has multiple bolt holes on two different patterns. With this one flange, you can install 1310, 1330 and 1350 series drive shaft in either CV or non-CV. It will also accept a 1410 series non-CV drive shaft. Using this flange and pilot also allows us to build a 1350 series CV drive shaft that will flex to 30º prior to binding and still allow for the sealing element in the center of the CV to remain intact.



Our flange also allows us to readily mount a park brake rotor.

Disclaimer

We reserve the right to change prices, or not sell an item, due to error in pricing.

Tail Shaft Conversion Kits

When lifting a Jeep Wrangler or Cherokee, one of the most common problems are drive shaft vibrations that are a result of excessive universal joint angles. With a Wrangler application the original drive shaft length is so short that even a minimal lift (2.5" or greater) The net universal joint angle will exceed even pushed limits and create torsional vibrations. On Cherokee applications, because there are no frame rails which will tend to isolate any vibrations and because of the box shaped construction of the body which tends to resonate more, we suggest that a Tail Shaft Conversion if you have installed more than 3" of lift.

We offer: *Advance Adapters* Heavy Duty (HD) tail shaft conversion. Our conversion design (early transfer case) that is very similar to the *Currie Conversion* (flanged output). Fixed yoke output of our design for the late model transfer case. These conversions are commonly referred to as "Slip Yoke Eliminators" (SYE). The slip yoke is not "eliminated", but rather, moved to a different portion of the drive shaft. Each of these conversions are offered as a complete package that includes everything required to modify the transfer case along with our top of the line CV drive shaft. This drive shaft will be **built to fit your vehicle** and is **not a "universal fit"** drive shaft.

You will need to supply:

1-oil for the transfer case
2-a small amount of silicon
3-possibly shims (placed between the springs and the spring perch) for the rear differential
4-With a TJ or a Grand Cherokee and coil spring suspension, you will need to have a set of adjustable trailing arms or adjustable cam bolts.

Any of these conversions will give you a fixed yoke/flange on the rear out-put of the transfer case. With any conversion you will also end up with a drive shaft that is longer from center of joint to center of joint than the original drive shaft. This will decrease the net universal joint angle, giving you a drive shaft that should last substantially longer and run vibration free. You should also be able to keep the transfer case at stock height on vehicles with up to 6" of lift.

Although either kit will work well in any 231 transfer case application. We have generally suggested that on a 1994 and older application, that the Genuine JB conversion would be the best choice and with a 1995 and newer application, the Advance Adapters conversion would be the best choice. This is because of the difference in the main shaft in the area where it goes through the synchronizer hub assembly or chain sprocket. Following this application guide, the customer did not have to mess with either pushing bearings in or out of this hub assembly. JB Conversions has changed the design of their main shaft to be more like that of Advance Adapters. The result of this is that with their current design of main shaft, you will need to push the bearings out of the chain sprocket in 1994 and older applications. When using the Advance Adapters conversions in 1994 and older applications, you must also remove these bearings.

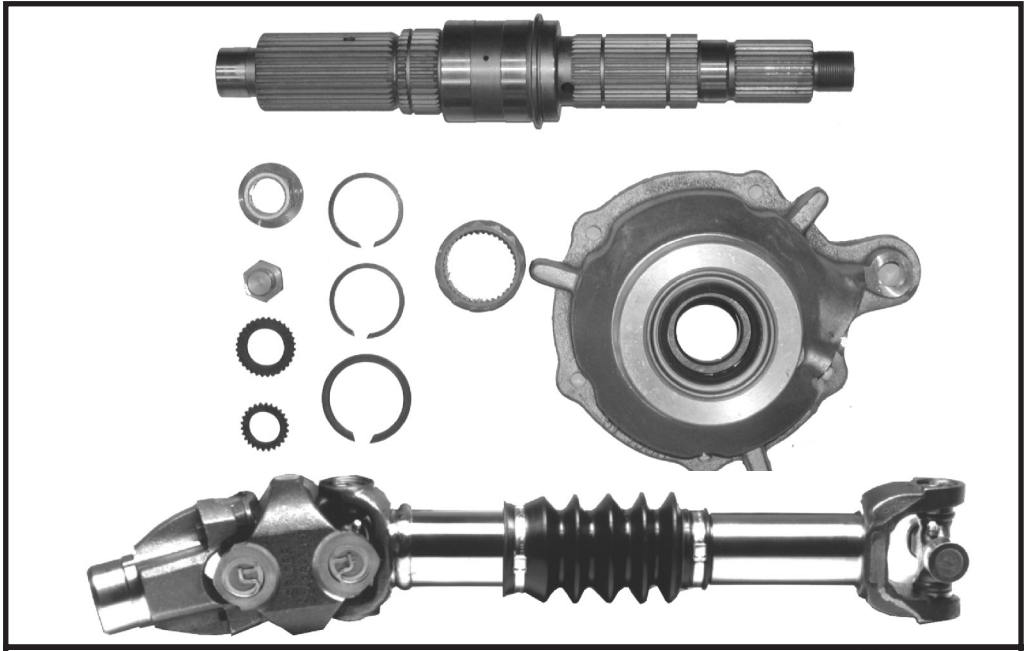
With any of these conversions, you have the option of having the drive shaft built with a more conventional slip yoke & spline stub rather than the long travel booted slip yoke & spline stub for **a cost savings of $30.** We would not consider this to be an issue of strength but more of longevity for these two parts.

In order to build the drive shaft to correctly fit your vehicle, we will need a measurement from the vehicle. If you have a TJ or a later model Cherokee with the rubber boot that attaches to the slip yoke on the drive shaft, measure from the slinger on the rear out-put of the transfer case (this will be the leading edge of the rubber boot) to the center of the universal joint at the rear differential. If you have a Wrangler or an earlier Cherokee, simply measure from the outermost lip of the rear out-put seal on the transfer case to the center of the joint at the differential end. From this original dimension we will be able to determine what the required length will need to be as an end result after you complete the conversion. If you have a Cherokee application, you will need to confirm the universal joint size at the rear differential per our measuring guide (refer to STEP 2, dimension E). This dimension will be either 3-7/32" or 3-5/8".

"Advanced Adaptors & "JB Conversion"

Heavy Duty Tail Shaft Conversion Kits

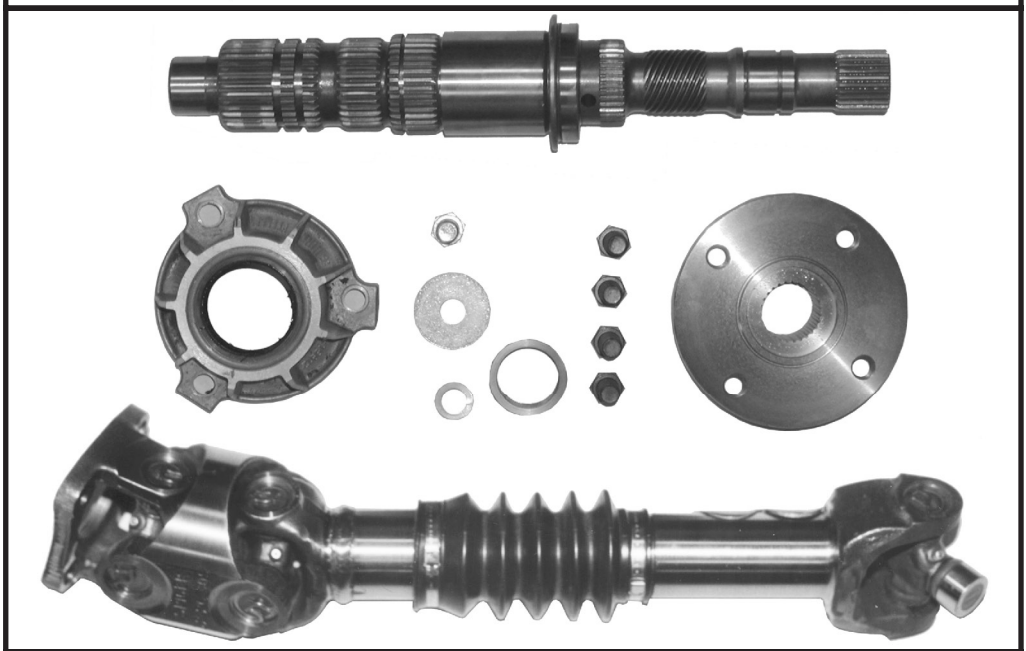
231 Transfer Case
This Kit includes:
A Heavy Duty Tom Wood Custom Drive Shaft!



"Tom Wood"

Tail Shaft Conversion Kit

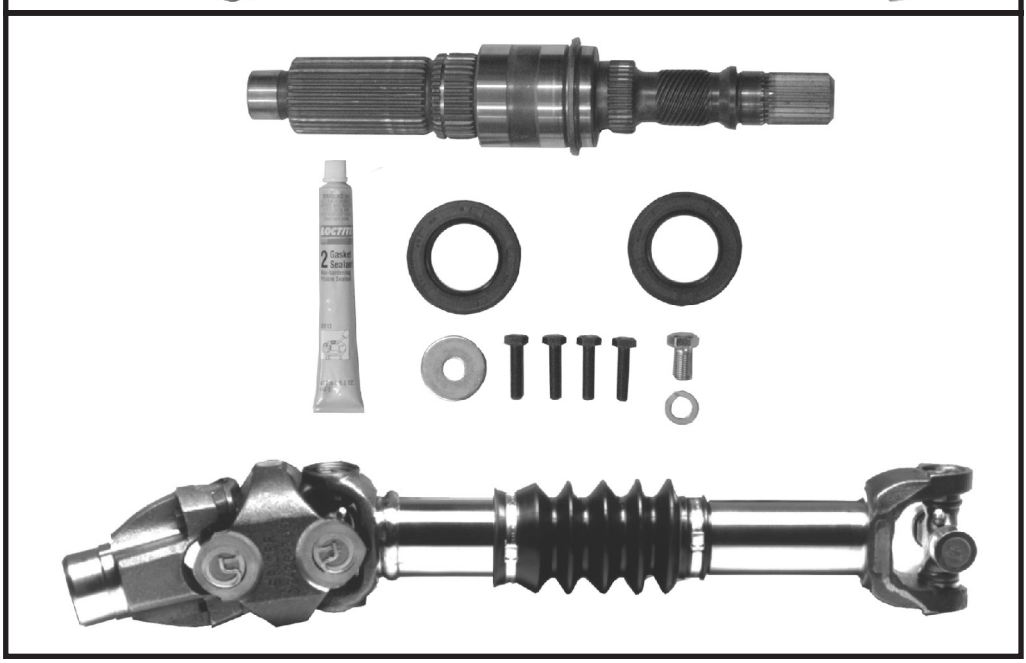
Early Design '95 & Older
207, 231 & 242
Transfer Case
This Kit includes:
A Heavy Duty Tom Wood Custom Drive Shaft!



"Tom Wood"

Tail Shaft Conversion Kit

Late Model '96 & Newer
231 & 242
Transfer Case
This Kit includes:
A Heavy Duty Tom Wood Custom Drive Shaft!



Our Top 20 Selling Drive Shafts

A-2-XB-131-131
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

B-2-XB-131-131
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

A-2-S-131-131
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

B-2-XC-131-131
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

A-2-XB-F1-131
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
F1 FLANGE FOR 1310 SERIES U-JOINT @ TRANSFER CASE
A=2" B=3.5" C=2.5" D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

B-125-XC-131-131
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
1.25” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

A-2-XB-131-F1
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
F1 FLANGE FOR 1310 SERIES U-JOINT @ DIFFERENTIAL
A=2" B=3.5" C=2.5" D=1.0625" E=3.2188"

B-2-U1-131-131
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
2” TUBE-ULTIMATE TRAVEL 10.5" SPLINE W/DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

B-2-S-131-131
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
2” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

A-2-XB-F1-DIN
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
F1 FLANGE FOR 1310 SERIES U-JOINT @ TRANSFER CASE
A=2" B=3.5" C=2.5" D=1.0625" E=3.2188"
DIN FLANGE FOR 1310 SERIES U-JOINT @ DIFFERENTIAL
A=2.375" B=3.125" C1=2" C2=2.375" D=1.0625" E=3.2188"

Our Top 20 Selling Drive Shafts

A-2-S-131-135
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1350 SERIES U-JOINT @ DIFFERENTIAL
D=1.188" E=3.625

B-2-S-135-135
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
2” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
1350 SERIES U-JOINT @ TRANSFER CASE
D=1.188" E=3.625
1350 SERIES U-JOINT @ DIFFERENTIAL
D=1.188" E=3.625

A-2-XB-131-133L
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1330 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.125" E=3.625"

A-2-XB-131-F2
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
F2 FLANGE FOR 1310 SERIES U-JOINT @ DIFFERENTIAL
A=2" B=4.25" C=3" D=1.0625" E=3.2188"

A-2-XB-GM1-131
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-FULL LENGTH EXTENDED LIFE SPLINE W/ BOOT
GM1 SAGINAW FLANGE FOR 3R SERIES U-JOINT @ TRANSFER CASE
A=3.125" B=4.25" C=3" D=1.125" F=2.5625"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

A-3-S-F4-135
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
3” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
F4 FLANGE FOR 1350 SERIES U-JOINT @ TRANSFER CASE
A=2" B=4.25" C=3" D=1.188" E=3.625"
1350 SERIES U-JOINT @ DIFFERENTIAL
D=1.188" E=3.625

B-2-U2-131-131
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
2” TUBE-ULTIMATE TRAVEL 22.5" SPLINE W/DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1310 SERIES LARGE CAP U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.2188"

A-275-S-F4-135
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2.75” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
F4 FLANGE FOR 1350 SERIES U-JOINT @ TRANSFER CASE
A=2" B=4.25" C=3" D=1.188" E=3.625"
1350 SERIES U-JOINT @ DIFFERENTIAL
D=1.188" E=3.625

A-2-S-131-133
TYPE A, DOUBLE CARDAN, CV DRIVE SHAFT
2” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
1310 SERIES U-JOINT @ TRANSFER CASE
D=1.0625" E=3.2188"
1330 SERIES U-JOINT @ DIFFERENTIAL
D=1.0625" E=3.625"

B-3-S-135-135
TYPE B, STANDARD SLIP, 2 JOINT DRIVE SHAFT
3” TUBE-STANDARD LENGTH SPLINE W/ DUST CAP
1350 SERIES U-JOINT @ TRANSFER CASE
D=1.188" E=3.625
1350 SERIES U-JOINT @ DIFFERENTIAL
D=1.188" E=3.625

Our Standard Warranty

Tom Wood's Custom Drive Shafts are custom manufactured to your specifications using the highest quality standards and are warrantied to the original purchaser or recipient only. This warranty is non transferable The purchaser shall be responsible to determine all design and/or specification parameters and the suitability of any particular product for its intended use.

Coverage:

Products purchased from Tom Wood's Custom Drive Shafts Inc. are warranted to be free from defects in materials or workmanship, for a period of 180 days from the date of purchase. Our liability for defects which may occur during the first 30 days of the coverage period will be repair, replacement or refund (as dictated by the discretion of the customer) upon return of product. Any defect which may occur after 30 days and prior to 180 days from the date of purchase. Product may be returned for repair or replacement at our sole discretion. Any failure of the weld will be warranted for the life of the drive shaft. This is the entire obligation of Tom Wood's Custom Drive shafts Inc. No other warranty is expressed or implied. Some states do not allow the exclusion of incidental or consequential so the above limitations may not apply to you. This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

Not covered in warranty:

Malfunctions due to improper installation, functional or design parameters, tampering or modification. Incidental or consequential damages. Acts of God or accident Failures which may occur as a result of lack of maintenance or damaged mating components. Any modification or repair by anyone other than Tom Wood's Custom Drive Shafts Inc. will void this warranty.

Our Exclusive Trail Hazard Protection Warranty

This is offered as a damage protection service only on our better grade of drive shafts.

Fairly straightforward (no attorneys involved). Basically this plan is designed to limit your loss in the event of an unforeseen failure.

The cost of this plan is an additional 20% of the retail price up front. Then if you are ever out wheeling and run over a rock, bend the tube or are just beating your way up a hill and the drive shaft breaks, all you will have to do is send the drive shaft to us and we will either repair or replace the shaft and return it to you (UPS ground) at no charge. In most instances this 20% charge will be considerably less than the cost of a simple re-tube of the drive shaft from your local shop. This warranty will cover one repair/replacement of a purchased drive shaft.

Limitations to this plan are that maintenance (greasing) will always be the customer's responsibility. The damage must be evident as a failure of, or damage to the drive shaft from trail hazards such as rock damage etc., and not a result of failure to related components. For example; if your strap & bolts on the pinion yoke you already had, break and create the damage to the drive shaft. This would not be covered. However, if you had purchased the Trail Hazard Protection along with a new pinion yoke and the same failure occurred, you will be covered. If the drive shaft has been modified from it's original form or otherwise reworked, by any individual or company other than ours, the protection plan will be voided. (We can only guarantee the quality of our workmanship and parts.