

**BORGESON**  
"Double Block" UNIVERSAL JOINTS  
with BACKLASH CONTROLLING features

**BORGESON**

**BORGESON**  
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**BORGESON**  
Catalog and Tech Guide  
*Mullins*

# BORGESON

## Steering You Forward



**BORGESON**  
Steering You Forward



PARTS CATALOG & TECHNICAL GUIDE



### PARTS CATALOG & TECHNICAL GUIDE



# INTRODUCTION

Founded in Torrington, CT, Borgeson Universal began manufacturing universal joints for lathes and milling machines in 1914. By the 1920's, Ford was using Borgeson universal joints for the steering on some of their prototypes. Borgeson Universal continued to develop and refine U-joints for industrial, aerospace and OEM vehicle applications. When purchased in 1982 by the current owners, two avid Street Rodders, Borgeson soon began developing applications for Street Rods. Borgeson has continually improved and developed the original needle bearing universal joints into the most reliable, smoothest operating, strongest U-joints available today.

Seeking to expand, Borgeson ventured into manual steering gears with the acquisition of Mullins Steering Gears in 2001 and in July 2012 Borgeson acquired the original equipment, tooling, drawings and the OE manufacturing rights for all Saginaw manual steering gear boxes. In 2016 Borgeson relocated from its home of over 100 years in Torrington CT and expanded into a new 101,000 square foot manufacturing facility in Travelers Rest SC. This 101,000 square foot plant was designed and built for increased production and capacity to better serve our customers. We use the latest manufacturing and inventory control procedures to maintain stock, and take great pride in being able to ship most orders placed by 1:30 EST the same day. Today, Borgeson is the leading manufacturer and supplier of aftermarket steering components for the street rod, racing, specialty automotive, OEM and pickup truck markets.

We believe our growth is based on a policy of honesty and always listening to our customers, whether you are a corporation or working in your garage. We respond to your suggestions by developing needed innovations to help increase steering system safety and make building your vehicle more fun. Our dedication to safety has been recognized by the National Street Rod Association with safety product of the year awards in 1992 & 2001 as well as Street Rod Manufacturer Of The Year in 1999 and NSRA Street Rod Achievement Award in 2015. Ultimately, your vehicle's safety depends on you. We strive to make Borgeson steering components as safe as possible. You can't buy a stronger, safer U-joint anywhere in the world! However, its effectiveness is only as good as the installation.

In this catalog, you will find many installation suggestions and guidelines that will help in the design of a safe, smoothly operating steering system. Call if you have any questions, our technical staff has over 95 years combined experience! Remember, auto manufacturers have thousands of engineers and millions of miles of road experience to rely on when designing a steering system. Without the benefit of those resources, the possibility of a malfunction is greater. So, overbuild your system and inspect it frequently. Safety should be your most important concern! We attend many shows during the year, so stop by our booth and say hello, we'll be happy to help!

**For sales and technical support, Call 860.482.8283  
Fax 864.610.2628 or visit [www.borgeson.com](http://www.borgeson.com)**

## *A message from Borgeson Vice President, Alan Zordan,*

Over 100 years ago, John Borgeson built a wooden universal joint model, dated July 22nd, 1914, for application to the United States Patent Office. His goal was to provide high quality products at a fair price. That very same universal joint graces our office today, as a tribute and reminder of where it all began.

My father purchased Borgeson from its previous owner in 1982. My journey began there in 1985, literally sweeping the floors. Back then I worked alongside my father and my grandfather, but these days I work alongside my children Abi and Zac. I am very proud to be able to pass down what I have learned and to continue the way John Borgeson wanted to do business.

Now teaching our 4th generation, Borgeson has the same goal; to create the best quality products at fair prices while providing outstanding customer service. I want to thank all of our customers who have made this American dream possible for our family.

***Thank you, Alan Zordan,  
Vice President, Borgeson Universal Co. Inc.***



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# SINGLE NEEDLE BEARING UNIVERSAL JOINTS

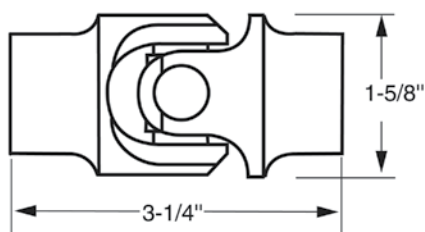
## Needle Bearing U-Joints

Needle bearing U-joints have the distinct advantage of lasting much longer than non-needle bearing U-joints. Borgeson recommends only needle bearing U-joints for use on street vehicles. Our U-joints are made of specially selected steel and stainless steel for strength and longevity. The sealed precision needle bearings never need maintenance. Needle bearing U-joints outlast non-needle bearing joints by a factor of 10 to 1. Our needle bearing joints have zero backlash (radial play) for more precise steering and a better feel for the road. Although non-needle bearing joints are stronger than the same size needle bearing joint, this strength is offset by the maintenance required and the longevity factor. Non-needle bearing joints should be lubricated with each use and a rubber boot should be used to retain lubrication. Boots are not recommended for use with needle bearing joints.

Borgeson U-joints are machined in our factory on state of the art CNC equipment from solid billet steel or stainless steel. Ongoing engineering and testing ensures our components meet or exceed current automotive production vehicle requirements. Any of our four Double D (a round shaft with two flats) sizes, 14 different spline size yokes, and the '94 and later Mustang V style can be combined to mate components from many different manufacturers. They operate at angles up to 35°. Similar to OEM U-joints, the staked needle bearing caps prevent loosening and adjustment malfunction.



Single Joint Dimensions



Steel



Stainless Steel



Polished Stainless Steel



**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) see page 34 for details.

## SINGLE UNIVERSAL JOINTS

Steel	Stainless Steel	Polished Stainless	Description
<b>Smooth X Smooth Bore</b>			
016464	116464	126464	3/4" Smooth x 3/4" Smooth
<b>Spline or DD X Smooth Bore</b>			
010964	110964	120964	9/16"-26 Spline x 3/4" Smooth
011864	111864	121864	5/8"-36 Spline x 3/4" Smooth
013164	113164	123164	3/4"-30 Spline x 3/4" Smooth
013464	113464	123464	3/4"-36 Spline x 3/4" Smooth
014064	114064	124064	13/16"-36 Spline x 3/4" Smooth
012564	112564	122564	11/16"-36 Spline x 3/4" Smooth
014364	114364	124364	1"-48 Spline x 3/4" Smooth
014664	114664	124664	17 mm DD x 3/4" Smooth
014964	114964	124964	3/4" DD x 3/4" Smooth
015264	115264	125264	1" DD x 3/4" Smooth
015564	115564	125564	3/4" Ford V x 3/4" Smooth
<b>Spline or DD x Spline or DD</b>			
014334	114334	124334	1"-48 Spline x 3/4"-36 Spline
014349	114349	124349	1"-48 Spline x 3/4" DD
014352	114352	124352	1"-48 Spline x 1" DD
013409	113409	123409	3/4"-36 Spline x 9/16"-26 Spline
013418	113418	123418	3/4"-36 Spline x 5/8"-36 Spline
013425	113425	123425	3/4"-36 Spline x 11/16"-36 Spline
013431	113431	123431	3/4"-36 Spline x 3/4"-30 Spline
013434	113434	123434	3/4"-36 Spline x 3/4"-36 Spline
013440	113440	123440	3/4"-36 Spline x 13/16"-36 Spline
013446	113446	123446	3/4"-36 Spline x 17mm DD
013449	113449	123449	3/4"-36 Spline x 3/4" DD
013452	113452	123452	3/4"-36 Spline x 1" DD
013737	113737	123737	3/4"-48 Spline x 3/4"-48 Spline
014909	114909	124909	3/4" DD x 9/16"-26 Spline
014912	114912	124912	3/4" DD x 9/16"-36 Spline
014918	114918	124918	3/4" DD x 5/8"-36 Spline
014921	114921	124921	3/4" DD x 5/8"-36 Chrysler Spline
014925	114925	124925	3/4" DD x 11/16"-36 Spline
014928	114928	124928	3/4" DD x 11/16"-40 Spline
014930	114930	124930	3/4" DD x 3/4"-20 Spline
014931	114931	124931	3/4" DD x 3/4"-30 Spline
014937	114937	124937	3/4" DD x 3/4"-48 Spline
014940	114940	124940	3/4" DD x 13/16"-36 Spline
014946	114946	124946	3/4" DD x 17mm DD
014949	114949	124949	3/4" DD x 3/4" DD
014955	114955	124955	3/4" DD x 3/4" Ford V
014952	114952	124952	3/4" DD x 1" DD
015225	115225	125225	1" DD x 11/16"-36 Spline
015231	115231	125231	1" DD x 3/4"-30 Spline
015240	115240	125240	1" DD x 13/16"-36 Spline
015252	115252	125252	1" DD x 1" DD
015255	115255	125255	1" DD x 3/4" Ford V

Many other sizes are available. Visit [www.borgeson.com](http://www.borgeson.com) for a full product listing.

THE PREFERRED STEERING OF





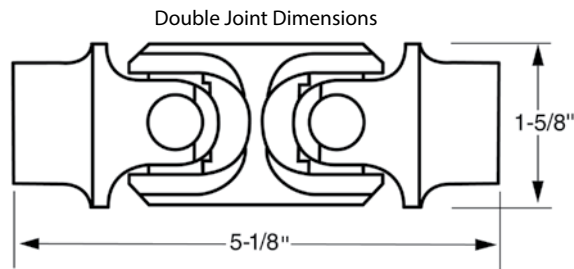
# DOUBLE NEEDLE BEARING UNIVERSAL JOINTS

Angles over 35° can be negotiated by using a Borgeson double universal joint. These double universal joints can accommodate angles up to 70°. Double universal joints are available in steel, stainless steel and polished stainless steel. Borgeson double universal joints are available in all of our popular spline and DD configurations.

**TECH TIP:** Because a double joint used in combination with a single joint will function the same as a three joint system, a shaft support bearing is required to prevent the shaft from "looping" and binding. *See page 7 for shaft support bearings.*



Polished Stainless Steel

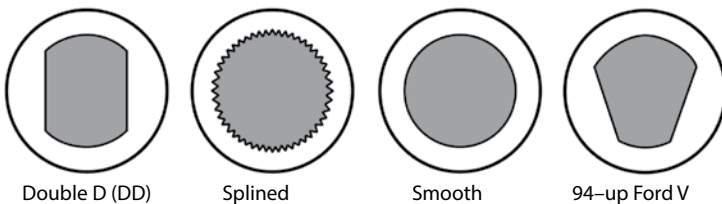


Double Joint Dimensions

**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) see page 34 for details.

Many other sizes are available. Visit [www.borgeson.com](http://www.borgeson.com) for a full product listing.

Different U-Joint Shaft Applications



Double D (DD)

Splined

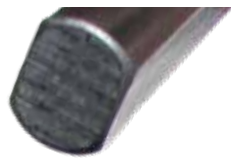
Smooth

94-up Ford V

Splined Shaft



3/4" Double D (DD) Solid



1" Double D (DD) Tubing



3/4" Ford-V



## DOUBLE UNIVERSAL JOINTS

Steel	Stainless Steel	Polished Stainless	Description
<b>Smooth X Smooth Bore</b>			
026464	136464	146464	3/4" Smooth x 3/4" Smooth
<b>Spline or DD X Smooth Bore</b>			
020964	130964	140964	9/16"-26 Spline x 3/4" Smooth
021864	131864	141864	5/8"-36 Spline x 3/4" Smooth
023164	133164	143164	3/4"-30 Spline x 3/4" Smooth
023464	133464	143464	3/4"-36 Spline x 3/4" Smooth
024064	134064	144064	13/16"-36 Spline x 3/4" Smooth
024364	134364	144364	1"-48 Spline x 3/4" Smooth
024664	134664	144664	17mm DD x 3/4" Smooth
024964	134964	144964	3/4" DD x 3/4" Smooth
025264	135264	145264	1" DD x 3/4" Smooth
<b>Spline or DD X Spline or DD</b>			
024334	134334	144334	1"-48 Spline x 3/4"-36 Spline
024349	134349	144349	1"-48 Spline x 3/4" DD
023409	133409	143409	3/4"-36 Spline x 9/16"-26 Spline
023418	133418	143418	3/4"-36 Spline x 5/8"-36 Spline
023431	133431	143431	3/4"-36 Spline x 3/4"-30 Spline
023434	133434	143434	3/4"-36 Spline x 3/4"-36 Spline
023449	133449	143449	3/4"-36 Spline x 3/4" DD
024949	134949	144949	3/4" DD x 3/4" DD
024946	134946	144946	3/4" DD x 17mm DD
024918	134918	144918	3/4" DD x 5/8"-36 Spline
024952	134952	144952	3/4" DD x 1" DD

## POPULAR SPLINE SIZES

Nominal Size	Diameter	Splines in a Full Circle
9/16"-17 Spline	.562	17
9/16"-26 Spline	.555	26
9/16"-36 Spline	.560	36
5/8"-36 Spline GM*	.610	36
5/8"-36 Spline Chrysler	.620	36
11/16"-36 Spline	.680	36
11/16"-40 Spline	.680	40
3/4"-20 Spline	.745	20
3/4"-30 Spline	.720	30
3/4"-36 Spline	.735	36
3/4"-48 Spline	.750	48
13/16"-36 Spline	.790	36
1"-48 Spline	.985	48

Actual size can measure .015" over or under the size listed.  
\*5/8"-36 GM and 5/8"-36 Chrysler are not interchangeable.

## TECH TIP:

**NOTE:** All listed spline counts are around a full theoretical circle.

**NOTE:** Double D shafts sizes are measured from round to round.

## DOUBLE D (DD) SIZES

Nominal Size	Approx. Dia.	Approx. Size Across Flats
17mm DD	.670	.570
18mm DD	.730	.610
3/4" DD	.750	.550
1" DD	.993	.790
3/4" Ford V	.750	N/A

# VIBRATION REDUCERS

Noise, vibration, and harshness are on top of the list of concerns for all automotive enthusiasts. With the more frequent use of rack & pinions and low profile tires, there are more road vibrations transmitted to the steering wheel than in the past. Using urethane to isolate all of the metal components, Borgeson has developed vibration reducers to diminish the annoying vibrations that are transmitted through the steering system and felt in the steering wheel. The use of the Borgeson vibration reducer results in an immediate improvement of the steering feel. As an added benefit, this reduction in vibration has been shown to increase the overall life of the steering components, including the steering column and box.

## DESIGN AND INSTALLATION TIP:

Don't install a vibration reducer in the center of a length of shaft. It can cause excess flexing and possible binding. If your system requires the use of a support bearing, the vibration reducer must be used between the support bearing and the column. The support bearing can pick up chassis vibration and will transfer it up the steering shaft to the wheel reducing the effects of the vibration reducer.

## Rubber Coupling/Rag Joints

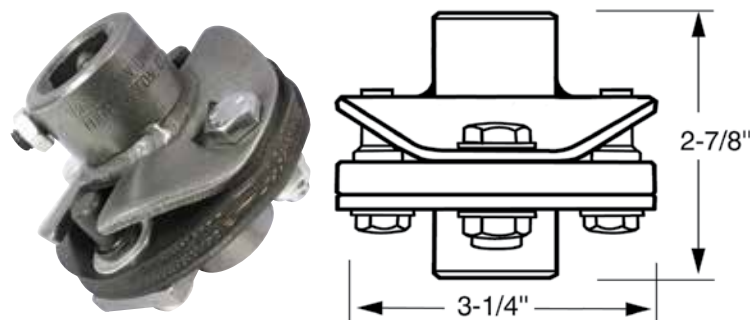
On older factory applications, a flexible coupling (rag joint) was used to attach the column to the steering box when there was perfect alignment. If the original column or box is changed, the stock coupling may not work. If a conversion from a long input steering box to a short input with an aftermarket column is done, a flexible coupling needs to be added. Borgeson offers the largest variety of spline and double D sizes to fit most applications. Rag Joints are only available in steel.

### RAG JOINTS

Part#	Description	Part #	Description
052534	11/16"-36 Spline x 3/4"-36 Spline	053452	3/4"-36 Spline x 1" DD
052543	11/16"-36 Spline x 1" 48 Spline	054043	13/16"-36 Spline x 1"-48 Spline
052549	11/16"-36 Spline x 3/4" DD	054052	13/16"-36 Spline x 1" DD
052552	11/16"-36 Spline x 1" DD	054649	17mm DD x 3/4" DD
053134	3/4"-30 Spline x 3/4"-36 Spline	054940	3/4" DD x 13/16"-36 Spline
053143	3/4"-30 Spline x 1" 48 Spline	054943	3/4" DD x 1"-48 Spline
053149	3/4"-30 Spline x 3/4" DD	054949	3/4" DD x 3/4" DD
053152	3/4"-30 Spline x 1" DD	054952	3/4" DD x 1" DD
053434	3/4"-36 Spline x 3/4"-36 Spline	055034	18mm DD x 3/4"-36 Spline
053440	3/4"-36 Spline x 13/16"-36 Spline	055043	18mm DD x 1"-48 Spline
053443	3/4"-36 Spline x 1"-48 Spline	055049	18mm DD x 3/4" DD
053449	3/4"-36 Spline x 3/4" DD	055052	18mm DD x 1" DD

Rag Joint

Rag Joint Dimensions



Stainless Steel Vibration Reducing Universal Joint

## Vibration Reducing Universal Joints

Vibration reducing universal joints or VJ's come with a 9/16"-26, 5/8"-36, 3/4"-30, 3/4"-36, or 3/4"-DD coupler end and any spline or DD size on the universal joint side. The VJ's are also available in stainless steel and polished stainless with the same sizes available.

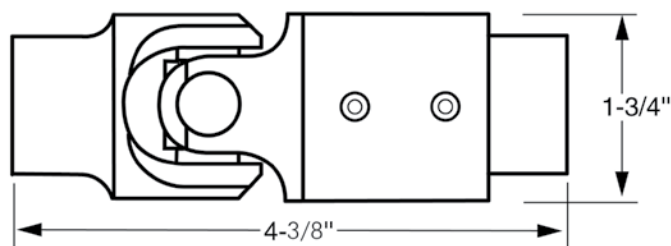
### VIBRATION REDUCING UNIVERSAL JOINTS

Steel	Stainless Steel	Polished Stainless	Description
033434	153434	163434	3/4"-36 Spline x 3/4"-36 Spline
033449	153449	163449	3/4"-36 Spline x 3/4" DD
033452	153452	163452	3/4"-36 Spline x 1" DD
033443	153443	163443	3/4"-36 Spline x 1"-48 Spline
034943	154943	164943	3/4" DD x 1"-48 Spline
034909	154909	164909	3/4" DD x 9/16"-26 Spline
034931	154931	164931	3/4" DD x 3/4"-30 Spline
034934	154934	164934	3/4" DD x 3/4"-36 Spline
034949	154949	164949	3/4" DD x 3/4" DD
034952	154952	164952	3/4" DD x 1" DD
034940	154940	164940	3/4" DD x 13/16"-36 Spline

\*Vibration reducers are not available with smooth bores. They should not be welded.

**Many other sizes are available. Visit [www.borgeson.com](http://www.borgeson.com) for a full product listing.**

Vibration Reducing Universal Joint Dimensions



**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) see page 34 for details.



# INTERMEDIATE SHAFTS

## Splined and Double D Shafting

We recommend splined or double D shafting, as it's a simple and safe method of attaching your steering components.

## Telescoping Shaft

Borgeson offers two telescoping shaft assemblies in 24" and 36" overall lengths. These shafts can be used in a variety of applications and make installation and removal of steering system components simple and easy. This telescopic shaft also meets NHTSA guidelines for collapsibility in passenger cars and adds a measure of safety.

**SAFETY TIP:** Welding can overheat the U-joint bearings causing loss of lubrication. **If welding is the only option, it should be done by a certified welder.** Drilling and pinning can be a safer option. *See page 28 for more information on pinning and proper shaft attachment.*

*See our design section beginning on page 23 for information about measuring your system.*

STEERING SHAFTS			
Steel	Stainless Steel	Polished Stainless	Description
Splined at Both Ends			
409202	N/A	N/A	3/4"-36 Spline x 2" Long
409204	419204	429204	3/4"-36 Spline x 4" Long
409206	419206	429206	3/4"-36 Spline x 6" Long
409208	419208	429208	3/4"-36 Spline x 8" Long
409210	419210	429210	3/4"-36 Spline x 10" Long
409212	419212	429212	3/4"-36 Spline x 12" Long
409214	419214	429214	3/4"-36 Spline x 14" Long
409216	419216	429216	3/4"-36 Spline x 16" Long
409218	419218	N/A	3/4"-36 Spline x 18" Long
409220	419220	N/A	3/4"-36 Spline x 20" Long
Splined at One End			
409005	N/A	N/A	3/4"-36 Spline x 5" Long
409016	N/A	N/A	3/4"-36 Spline x 16" Long
409036	N/A	N/A	3/4"-36 Spline x 36" Long
3/4" Double D (DD)			
409412	419412	429412	3/4" DD x 12" Long
409418	N/A	N/A	3/4" DD x 18" Long
409436	419436	429436	3/4" DD x 36" Long
N/A	419422	429422	3/4" DD x 22" Long
1" Double D Tubing			
409506	N/A	N/A	1" DD x 6" Long
409536	N/A	N/A	1" DD x 36" Long
Telescoping Shafting			
450024	N/A	N/A	24" Telescopes 21"-27"
450036	N/A	N/A	36" Telescopes 30"-39"

Many other sizes are available. Visit [www.borgeson.com](http://www.borgeson.com) for a full product listing.

THE PREFERRED STEERING OF



**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) see page 34 for details.

**Steel 3/4" Splined Shafts** are splined 2" on both ends. They are available in 2" increments from 2" to 36". Each end can be trimmed up to 1" for an exact fit. Steel 3/4" round shafts that are splined on one end are available in 5", 16", and 36" lengths.



**Stainless Steel 3/4" Splined Shafts** are available in 1/4" increments from 3" to 24" lengths with 7/8" of spline on each end and 1" increments up to 36" length. **Polished splined shafts are available in 3"-16" lengths in 1/4" increments.** (Polished shown)



**Steel Double D Shafts** are available in 12", 18" and 36" lengths only. They are easy to trim to get an exact fit.



**Stainless Steel Double D Shafts** are available in 12", 22" and 36" lengths. All stainless shafting is available polished or unpolished. (polished shown)



**1" Double D Tubing** is available in 6" and 36" lengths only. 1" DD Tubing is only available in steel.



## Telescoping Shafts

Borgeson offers two telescoping shaft assemblies in 24" and 36" overall lengths. Telescopic shafts can be easily trimmed to fit many applications.





# SHAFT SUPPORTS

## Steering Supports

If more than two joints are used in a steering system, a support bearing must be used to prevent looping and binding. Use of a vibration reducer and two U-joints will also call for a support bearing to be used. The support must be mounted to the frame, not to a sheet metal section of the body; sheet metal will not withstand the stress. The shaft should fit easily through the support with no binding. A system with a double U-joint and a single U-joint has three flex points and will require a support bearing.

**All support bearings work with 3/4" round or DD shafting.**

Rod end bearings with a 3/4" hole size are commonly used for supports. Rod end bearings are supplied with two jam nuts for mounting. They are available in steel, stainless steel and polished stainless steel. Our billet supports accommodate a 3/4" shaft. The billet supports are 2-1/2" long with two threaded holes in the end for mounting and are only available in steel. A 6" steel support is also available, which can be cut at any angle for a perfect fit. The 6" steel support has no mounting holes and must be welded in. Flange bearings are also available for supporting a shaft through the firewall.



THE PREFERRED STEERING OF  
**GOODGUYS**  
Rat & Custom Association



## STEERING SUPPORTS

Part #	Description
670000	Billet Steel Support Bearing
670600	6" Billet Steel Cut and Weld Support Bearing
700000	Steel Rod End Bearing
710000	Stainless Steel Rod End Bearing
720000	Polished Stainless Steel Rod End Bearing
700010	Firewall Flange Bearing



Rod End Shaft Support



Billet Shaft Support

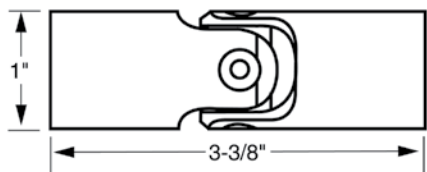


Steel "cut-and-weld"  
Billet Shaft Support



Firewall Flange Bearing

## PIN & BLOCK RACING JOINTS



The advantage to the pin and block style of universal joint is a high strength to weight, size and cost ratio. These U-joints are manufactured from high strength billet alloy steel and then heat treated to obtain maximum strength. **Because the U-joints use pivot pins and blocks instead of sealed needle bearings, they must be checked and lubricated every time the vehicle is driven.** The smaller sizes are ideal for fabricating shift linkage. Borgeson pin and block U-joints have a 30° maximum operating angle. **These U-joints are not for street use.**

## 1" FOR DRAG STEERING & SHIFT LINKAGE

Part #	Description
<b>Smooth X Smooth</b>	
515959	1/2" Smooth Bore x 1/2" Smooth Bore
515962	1/2" Smooth Bore x 5/8" Smooth Bore
515964	1/2" Smooth Bore x 3/4" Smooth Bore
516262	5/8" Smooth Bore x 5/8" Smooth Bore
516462	5/8" Smooth Bore x 3/4" Smooth Bore
516464	3/4" Smooth Bore x 3/4" Smooth Bore
<b>Spline X Smooth</b>	
510962	9/16"-26 Spline x 5/8" Smooth Bore
510964	9/16"-26 Spline x 3/4" Smooth Bore

**WARNING:** Cancer and Reproductive Harm -  
www.P65Warnings.ca.gov see page 34 for details.



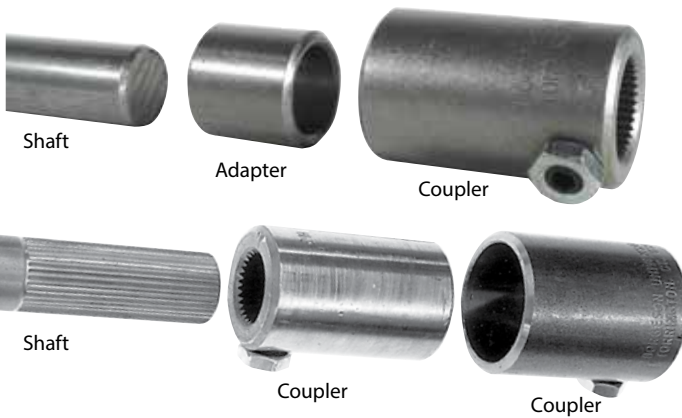
# COUPLERS & ADAPTERS

## Couplers and Adapters

A U-joint can sometimes be eliminated by using a 2" straight extension, called a coupler. The 1"- 48 and 1" DD couplers have a 1-1/4" hole that will accept either an adapter to reduce inside diameter to 3/4" smooth or another splined or 3/4" DD coupler. The coupler assembly would have to be pinned and/or welded together. Welding the coupler is acceptable because there are no moving parts to damage. Couplers are available in the same spline or double D sizes as our universal joints. Couplers and adapters are available in steel only.

### ADAPTERS

Part #	Description
358000	3/4" Inside Diameter x 1" Outside Diameter Adapter
358200	3/4" Inside Diameter x 1-1/4" Outside Diameter Adapter



### COUPLERS

Part #	Description
310600	9/16"-17 Spline x 3/4" Smooth Bore, 1" Outside Diameter
310900	9/16"-26 Spline x 3/4" Smooth Bore, 1" Outside Diameter
311200	9/16"-36 Spline x 3/4" Smooth Bore, 1" Outside Diameter
311800	5/8"-36 Spline x 3/4" Smooth Bore, 1" Outside Diameter
312100	5/8"-36 Chrysler Spline x 3/4" Smooth Bore, 1" Outside Diameter
312500	11/16"-36 Spline x 3/4" Smooth Bore, 1" Outside Diameter
312800	11/16"-40 Spline x 3/4" Smooth Bore, 1" Outside Diameter
313100	3/4"-30 Spline x 3/4" Smooth Bore, 1-1/4" Outside Diameter
313400	3/4"-36 Spline x 3/4" Smooth Bore, 1-1/4" Outside Diameter
313434	3/4"-36 Spline Through Coupler, 1-1/4" Outside Diameter
313449	3/4"-36 Spline x 3/4" DD Welded Coupler, 1-1/2" Outside Diameter
313700	3/4"-48 Spline x 3/4" Smooth Bore, 1-1/4" Outside Diameter
314000	13/16"-36 Spline x 1" Smooth Bore, 1-1/2" Outside Diameter, use with #358000
314300	1"-48 Spline x 1-1/4" Smooth Bore, 1-1/2" Outside Diameter, use with #358200
314349	1"-48 Spline x 3/4" DD Welded Coupler, 1-1/2" Outside Diameter
314600	17mm DD x 3/4" Smooth Bore, 1-1/4" Outside Diameter
314900	3/4" DD x 3/4" Smooth Bore, 1-1/4" Outside Diameter
314925	3/4" DD x 11/16"-36 Spline Welded Coupler, 1-1/2" Outside Diameter
314949	3/4" DD x 3/4" DD Through Coupler, 1-1/4" Outside Diameter
315200	1" DD x 1-1/4" Smooth Bore, 1-1/2" Outside Diameter, use with #358200
315225	1" DD x 11/16"-36 Spline Welded Coupler, 1-1/2" Outside Diameter
315249	1" DD x 3/4" DD Welded Coupler, 1-1/2" Outside Diameter
315252	1" DD x 1" DD Through Coupler, 1-1/2" Outside Diameter



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## INDUSTRIAL & SPECIALTY VEHICLE APPLICATIONS

Borgeson manufactures custom universal joints, steering shaft assemblies and OEM Saginaw manual steering gears for industrial, government and OEM applications. Borgeson has the personnel and technology to work with you to manufacture custom universal joints and shaft assemblies for your application. Contact our sales office for further information.

### BORGESON UNIVERSAL JOINTS

For AGRICULTURAL • AIRCRAFT • INDUSTRIAL  
and MARINE APPLICATIONS

#### For INDUSTRY

Warner & Swasey Co.,  
Pin Drafter Intersecting  
Draw Frame equipped  
with Borgeson Universal  
Joints, for use in the  
Textile Industry.



#### For AIRCRAFT

Borgeson Universal  
Joints have many  
uses in the Aircraft  
Industry.



#### For AGRICULTURE

Food Machinery and  
Chemical Corp. Uni-  
versal Corn Cutter,  
utilizing Borgeson  
Universal Joints.



#### For MARINE APPLICATION

Borgeson Furnishes  
Universal Joints of  
Corrosion Resistant  
metal for Marine  
Applications.



# COLUMN DROPS & FLOOR MOUNTS

## Solid or Split Swivel Floor Mounts

Our easy to install, solid full circle design slides over the end of the steering column. This provides a secure way to mount the column to the floor. The inner collar pivots to accommodate any floor angle. Available for 1-1/2", 1-3/4", 2" and 2-1/4" columns. A split design that separates in half to clear the column shift lever is also available; the split design can be installed on a column already in the vehicle; available for 2" and 2-1/4" columns. We manufacture all floor mounts from solid billet aluminum.



### COLUMN FLOOR MOUNTS

Machined	Polished	Description
909013	909014	Solid Swivel, 1-1/2" Diameter Column
909001	909002	Solid Swivel, 1-3/4" Diameter Column
909003	909004	Solid Swivel, 2" Diameter Column
909005	909006	Solid Swivel, 2-1/4" Diameter Column
909007	909008	Split Swivel, 2" Diameter Column
909009	909010	Split Swivel, 2-1/4" Diameter Column



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## Steering Column Drops

Drops are available in three styles and various hole diameters to fit most columns. We machine these from solid billet aluminum. The adjustable swivel easily accommodates different column and dash angles. Available in 1-3/4", 2", 2-1/4" and 2-3/8" diameter holes and lengths of 2", 3", 4", 5", 6" and 7". The 2-3/8" drop has a notch to clear the wire harness cover on GM columns.

### BILLET ALUMINUM COLUMN DROPS

Drop Size (Diameter x Length)	Solid Matte	Solid Polished	Open Matte	Open Polished	Recessed Matte	Recessed Polished
1-3/4" Diameter Column x 2" Drop	910172	911172	NA	NA	NA	NA
1-3/4" Diameter Column x 3" Drop	910173	911173	912173	913173	914173	915173
1-3/4" Diameter Column x 4" Drop	910174	911174	912174	913174	914174	915174
1-3/4" Diameter Column x 5" Drop	910175	911175	912175	913175	914175	915175
1-3/4" Diameter Column x 6" Drop	910176	911176	912176	913176	914176	915176
1-3/4" Diameter Column x 7" Drop	910177	911177	912177	913177	914177	915177
2" Diameter Column x 2" Drop	910202	911202	NA	NA	NA	NA
2" Diameter Column x 3" Drop	910203	911203	912203	913203	914203	915203
2" Diameter Column x 4" Drop	910204	911204	912204	913204	914204	915204
2" Diameter Column x 5" Drop	910205	911205	912205	913205	914205	915205
2" Diameter Column x 6" Drop	910206	911206	912206	913206	914206	915206
2" Diameter Column x 7" Drop	910207	911207	912207	913207	914207	915207
2-1/4" Diameter Column x 2" Drop	910222	911222	NA	NA	NA	NA
2-1/4" Diameter Column x 3" Drop	910223	911223	912223	913223	914223	915223
2-1/4" Diameter Column x 4" Drop	910224	911224	912224	913224	914224	915224
2-1/4" Diameter Column x 5" Drop	910225	911225	912225	913225	914225	915225
2-1/4" Diameter Column x 6" Drop	910226	911226	912226	913226	914226	915226
2-1/4" Diameter Column x 7" Drop	910227	911227	912227	913227	914227	915227
2-3/8" Diameter Column x 3" Drop	910233	911233	NA	NA	NA	NA
2-3/8" Diameter Column x 4" Drop	910234	911234	NA	NA	NA	NA



## Hi-Pressure Problem Solver



### Pressure Reducing Kit

This kit contains tools, parts and instructions to reduce the pressure of GM pumps to operate rack & pinions or to increase steering "feel". Fits both Self-Contained & Remote Reservoir Type II pumps.

#### PRESSURE REDUCING KIT

899001 Pressure Reducing Kit for Self Contained and GM Type II Pumps



## Remote Power Steering Reservoirs

Our billet aluminum power steering reservoir is available in either a polished or unpolished finish. The reservoir has an internal baffle plate and includes an O-Ring sealed cap and mounting bracket. It uses standard NPT fittings.



### REMOTE POWER STEERING RESERVOIR

Part #	Description
800600	Remote reservoir with bracket, Polished
800601	Remote reservoir with bracket, Unpolished

# PUMPS, BRACKETS, PULLEYS & COOLERS

## Self Contained Power Steering Pumps, Brackets & Pulleys

These are new manufactured Saginaw style self-contained power steering pumps made to precise tolerances. Pumps are available with either a black powder coated or chrome reservoir. We also offer pumps preset to the lower operating pressure for Mustang rack & pinions, and pumps with two returns for Hydro-Boost brake applications. Our pump brackets are all designed for Saginaw self-contained pumps with two mounting locations on the rear of the reservoir. Brackets are designed with simplicity and ease of installation in mind.

**See photos below for return tube locations.**



### SAGINAW POWER STEERING PUMPS

Part #	Description
800310	Black Powder Coated Self-Contained Power Steering Pump with Keyway Shaft, Pump Pressure is 1200-1350 PSI with a 2.7-3.5 GPM Flow Rate
800311	Chrome Self-Contained Power Steering Pump with Keyway Shaft, Pump Pressure is 1200-1350 PSI with a 2.7-3.5 GPM Flow Rate
800312	Black Powder Coated Self-Contained Power Steering Pump with Keyway Shaft for Mustang R&P, Pump Pressure is 950-1050 PSI with a 2.7-3.5 GPM Flow Rate
800313	Chrome Self-Contained Power Steering Pump with Keyway Shaft for Mustang R&P, Pump Pressure is 950-1050 PSI with a 2.7-3.5 GPM Flow Rate
800322	Black Powder Coated Self-Contained Power Steering Pump with 1 Row Pulley and Press-On Shaft, Pump Pressure is 1200-1350 PSI with a 2.7-3.5 GPM Flow Rate
800323	Black Powder Coated Self-Contained P/S Pump with Two Returns for Hydro-Boost, Press-On Shaft, Pump Pressure is 1450-1550 PSI with a 3.0-3.5 GPM Flow Rate
800325	Black Powder Coated Self-Contained Power Steering Pump with Press-On Shaft, Pump Pressure is 1200-1350 PSI with a 2.7-3.5 GPM Flow Rate
800329	Black Powder Coated Self-Contained Power Steering Pump with 1 Row Pulley and Press-On Shaft, Pump Pressure is 1200-1350 PSI with a 2.7-3.5 GPM Flow Rate



#800310,#800312,#800327



#800311,#800313



#800323



#800324,#800325#800329



#800322,#800326

### SELF CONTAINED PUMP BRACKETS

Part #	Description
802400	Self Contained Pump Bracket, Small Block Chevy, Short Water Pump
802402	Self Contained Pump Bracket, Small Block Chevy, Long Water Pump
802403	Self Contained Pump Bracket, Big Block Chevy, Short Water Pump
802407	Self Contained Pump Bracket, Big Block Chevy, Long Water Pump
802409	Self Contained Pump Bracket, Small Block Ford, 289/302/351W
802410	Self Contained Pump Bracket, Ford 200/250 In-Line 6 Cylinder
802411	Self Contained Pump Bracket, Ford 292/312 Y-Block
802412	Self Contained Pump Bracket, Small Block Mopar 318/340/360
802413	Self Contained Pump Bracket, Ford FE, 352/390/427/428
802414	Self Contained Pump Bracket, Big Block Mopar 383/440



### POWER STEERING PULLEYS

Part #	Description
801001	Steel P/S Pulley, 2-Row with Keyway, Painted Black, 5-3/4"
801105	Steel P/S Pulley, 1-Row Press-On, Painted Black, 5-3/4"
801202	Aluminum P/S Pulley, 1-Row with Keyway, 4-5/8"
801102	Polished Aluminum P/S Pulley, 1-Row with Keyway, 4-5/8"



## Power Steering Cooler Kits

Lower temperatures prolong component life and maintain consistent steering feel as temperatures rise. Kits include either a 2 pass or 4 pass cooler and all needed hose and hardware.

### POWER STEERING COOLER KITS

Part #	Description
925125	Standard Power Steering Cooler Kit, Includes 2.5" X 9" 2-Pass Cooler
925126	Heavy Duty Power Steering Cooler Kit, Includes 5" X 9" 4-Pass Cooler

#925126 HD P/S Cooler Kit



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# SAGINAW GM MANUAL STEERING BOXES

## OEM Saginaw Manual Boxes

Borgeson is now the OEM manufacturer of Saginaw manual steering gears. Borgeson Saginaw manual steering boxes are assembled to the same demanding standards as our precision universal joints. Each box is carefully assembled, adjusted and inspected to our factory specifications. Borgeson offers both standard crossover steering boxes and reversed boxes for side steer applications. These steering boxes are made in the USA and have a 3 year warranty.

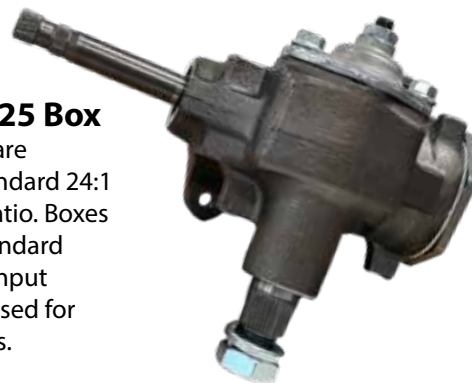
### OEM Saginaw 140 Box

This is a real Vega box 100% made in the USA, not a cheap copy. The Vega 140 is recommended only for vehicles under 2400 lbs. Steering ratio is 22:1. Reversed boxes are also available.



### OEM Saginaw 525 Box

New OEM 525 boxes are available in either standard 24:1 ratio or a quick 16:1 ratio. Boxes are available with standard length or shortened input shafts. Available reversed for side steer applications.




## MANUAL BOXES FOR STREET ROD APPLICATIONS

Part #	Description
920004	Brand New OEM Saginaw 140 Vega Steering Box, Made in the USA, Standard 22:1 Ratio with a 5/8"-36 Input Spline and a 1"-32 Spline GM Pitman Shaft
920007	Brand New Reversed Saginaw 140 Vega Steering Box for Side Steer Applications, Standard 22:1 Ratio with a 5/8"-36 Input Spline and a 1"-32 Spline GM Pitman Shaft
920010	Brand New OEM Saginaw 525 Steering Box, Made in the USA, Standard 24:1 Ratio with a 3/4"-30 Input Spline and a 1-1/8"-32 Spline GM Pitman Shaft
920055	Brand New OEM Saginaw 122 Steering Box, Made in the USA, Standard 24:1 Ratio with a 3/4"-36 Input Spline and a 1-1/8"-32 Spline GM Pitman Shaft
920009	Brand New Reversed Saginaw 525 Steering Box for Side Steer Applications, Standard 24:1 Ratio with a 3/4"-30 Input Spline and a 1-1/8"-32 Spline GM Pitman Shaft
920040	Brand New OEM Saginaw 525 Steering Box, Made in the USA, Quick 16:1 Ratio with a 3/4"-36 Input Spline and a 1-1/8"-32 Spline GM Pitman Shaft
920030	Brand New OEM Saginaw 525 Steering Box with Shortened Input for Street Rod Applications, 16:1 Quick Ratio with a 3/4"-36 Input Spline and a 1-1/8"-32 Spline GM Pitman Shaft
920011	Brand New OEM 525 Steering Box with Shortened Input for Street Rod Applications, Standard 24:1 Ratio with a 3/4"-36 Input Spline and a 1-1/8"-32 Spline GM Pitman Shaft

## OEM Saginaw Side-Steer

This is a brand new manufactured Saginaw 525 series gear that is designed specifically for side-steer applications. This is a true recirculating ball Saginaw manual steering box available in two different rotations to suit pitman arms that face either up or down.



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### Manual Conversion Kit



## Power to Manual Conversion Kits

Borgeson gives you a great way to shed up to 28 pounds and free up some extra horsepower with our complete power to manual conversion kits. Each direct fit conversion kit includes a new OEM Saginaw 525 box, pitman arm and half rag joint. Quick ratio steering boxes are also available.

## SAGINAW SIDE-STEER SERIES

Part #	Description
920041	16:1 Ratio, Right Turn Makes Upward Facing Arm Pull Back
920042	16:1 Ratio, Right Turn Makes Upward Facing Arm Push Forward
920043	24:1 Ratio, Right Turn Makes Upward Facing Arm Pull Back
920044	24:1 Ratio, Right Turn Makes Upward Facing Arm Push Forward

## POWER TO MANUAL CONVERSION KITS

Part #	Description
999001	1978-1988 Malibu and 1982-1992 Camaro
999002	1964-1967 Chevelle, 442, GT0
999003	1970-1981 Camaro and 1975-1979 Nova
999004	1968-1972 Chevelle, 442, GT0

# BORGESON GM POWER STEERING

## Power Steering Box & Accessories

Borgeson Universal now offers an all new modern quick ratio power steering box to replace the Saginaw/Delphi 800 series in most 1965 and up GM muscle cars. This all new power steering box has a quick 12.7:1 ratio with firm modern steering feel. The Borgeson Street & Performance power steering box will bolt directly to the stock location and fit to the original power steering pitman arms. Cars switching from manual steering will require a power steering pitman arm. Steering box includes adapters to be able to use either O-ring or flare style hose connections. This new Borgeson steering box uses a 3/4"-30 spline input shaft and all pre -1977 cars will require a new rag joint connector #990012.

### POWER STEERING BOX & ACCESSORIES

Part #	Description
800130	Borgeson Street & Performance Steering Box, 12.7:1 Ratio, 3/4-30 Spline
990012	3/4-30 Spline Rag Joint Coupler, for pre -1977 applications
925103	2 Piece P/S Hose Kit, Rubber, GM Pump to GM Box
800310	GM Power Steering Pump with Keyway, Black
800311	GM Power Steering Pump with Keyway, Chrome
802400	P/S Pump Bracket, Steel, Small Block Chevy / Short Water Pump
802402	P/S Pump Bracket, Steel, Small Block Chevy / Long Water Pump
802403	P/S Pump Bracket, Steel, Big Block Chevy / Short Water Pump
802407	P/S Pump Bracket, Steel, Big Block Chevy / Long Water Pump
801001	P/S Pump Pulley GM 2-Row, Keyway Style

### 800130 SPECIFICATIONS

Input Shaft	3/4"-30 Spline with flat, .720-.725 actual with 25 splines present
Pitman Shaft	GM 1-1/4" with 32 splines and 4 master splines
Pressure Port	M18 X 1.5 O-Ring or 11/16"-18 Flare, if using included flare inserts
Return Port	M16 X 1.5 O-Ring or 5/8"-18 Flare, if using included flare inserts
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.5-3.0 GPM Flow rate recommended

### PITMAN ARMS

Part	Description
806003	122/525/605 Bendable Steel, GM Manual, 1.125" Shaft Size (6" between centers)
806008	700/600/530 GM Power Boxes, 1.25" Shaft Size, Cleaned, Inspected and Painted
806016	122/525/605 Bendable Steel, GM Manual, 1.125" Shaft Size (7" between centers)
806018	700/600 GM Power Boxes, 1.25" Shaft Size, Steel, Flat (7" between centers)
806010	Vega 140 Steel, Flat, Bendable, GM Vega Only, 1" Shaft Size, (6" between centers)



THE PREFERRED STEERING OF



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Borgeson #800130



#990012 Rag Joint Coupler

### 800130 Applications:

1967-1992 Camaro & Firebird

1968-1974 Nova

1964-1977 GM "A" Body (Chevelle, El Camino, Cutlass, Skylark)

1965-1970 Impala & Caprice

1978-1988 GM "G" Body (Monte Carlo, Malibu, Regal, Cutlass)

1982-2002 Chevy S-10 & GMC S-15

**For full application information visit [www.borgeson.com](http://www.borgeson.com)**

## Power Steering Fittings

Borgeson offers several -6AN fitting adapters as well as O-ring to flare conversion inserts for power steering systems. All Borgeson fittings are made from brass or aluminum.



#925128 GM Box

#925121

#925122 Conversion Set

### POWER STEERING FITTINGS & ADAPTERS

Part #	Description
925120	14mm and 16mm Top Seal O-Ring to -6AN
925121	16mm and 16mm Flare to -6AN
925122	GM O-ring to Flare Conversion Inserts, Set of 3
925124	14mm and 14mm Top Seal O-Ring to -6AN
925127	GM Saginaw Pump, Flare or O-Ring to -6AN
925128	GM Saginaw / Delphi Box Flare or O-ring to -6AN

# 1949-51 MERCURY CARS

Borgeson Universal has developed and is now producing an integral power steering conversion box for the 1949-1951 Mercury cars. This conversion box is an all new manufactured quick ratio power steering gearbox that has undergone extensive modifications to be a direct bolt in for 1949-1951 Mercury's. The Borgeson conversion box will fit with NO modifications to the frame as it is a direct bolt in to the factory mounting location. It also includes a pitman arm to connect directly to the stock steering linkage. This power steering conversion box is longer than the stock box and will require the steering column to be shortened approximately 3" for clearance.

## 1941-1951 MERCURY CONVERSION

Part #	Description
800131	Power Conversion Box for 1949-1951 Mercury Cars
990044	Original Steering Column, "Column Saver Kit"
925108	Hose Kit, Borgeson 800131 Box to Saginaw Style Pump
925121	Adapter Set. Adapts Conversion Box to -6AN for Custom Hose Applications
015225	1" DD X 11/16"-36 Spline Universal Joint for use with Aftermarket Columns
052552	1" DD X 11/16"-36 Spline Rag Joint for use with Aftermarket Columns

## 800131 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual
Pitman Shaft	1-1/8" with 32 splines and 4 master splines, Includes Pitman Arm
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended

#800131 Power Box



# 1949-51 FORD CARS

**999062** Power steering conversion kit that consists of a specially made Borgeson reverse rotation gearbox in a 14:1 ratio paired with a Fatman Fabrications custom fabricated bracket and pitman arm. Factory original steering column can be used with the conversion but will need to be shortened and adapted to the steering box. **Note: Not for use with a flathead engine due to exhaust clearance.**

**990044** Column saver kit includes everything needed to maintain the stock steering column in your 1949-1951 Ford when installing the power conversion box.

## 1941-1951 FORD CONVERSION

Part #	Description
999062	Power Conversion Kit for 1949-1951 Ford Cars
990044	Original Steering Column, "Column Saver Kit"
925108	Hose Kit, Borgeson Box to Saginaw pump V-8
925121	Adapter Set. Adapts Conversion Box to -6AN for Custom Hose Applications
015225	1" DD X 11/16"-36 Spline Universal Joint for use with Aftermarket Columns

## 999062 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual
Pitman Shaft	1-1/8" with 32 splines and 4 master splines, Includes Pitman Arm
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended



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999062 Conversion Kit



990044 Column Saver Kit



OFFICIAL STEERING  
COMPONENTS OF THE  
NATIONAL STREET  
ROD ASSOCIATION



## Mopar Quick Ratio Modern Power Steering Conversion

Borgeson has developed a modern quick ratio power steering box for the 62-79 Mopar cars. This modern power steering box bolts directly to the stock K-Frame and fits your stock pitman arm. The Borgeson quick ratio power steering box offers a 14:1 ratio with only 3.5 turns lock-to-lock, 10lb weight savings over a stock power box (23lbs vs. 33lbs), increased exhaust clearance and a tight modern feel to the steering. The Borgeson conversion box can be used in both factory manual and power steering applications. Complete conversion kits are available for both small block and big block applications.

***This box is offered in both 1-1/8" and 1-1/4" pitman shaft sizes. In general cars up to 1972 use the smaller 1-1/8" shaft and the 1973 and later use the 1-1/4" shaft. Be sure to measure to insure you receive the correct box.***

### Steering Column Modifications

The original steering column shaft will need to be cut and shortened for installation. Connection to the box is then made by drilling and pinning our #036425 Mopar vibration reducing universal joint coupler to the shortened steering column shaft. Drill bit and pins included with coupler.



### 1962-1979 MOPAR CARS

#### Power Conversion Box & Components

800126	Power Steering Conversion Box 62-79 Mopar 1-1/8" Sector Shaft
800127	Power Steering Conversion Box 62-79 Mopar 1-1/4" Sector Shaft
999063	Complete Conversion Kit, Small Block 318/340/360 Engine, 1-1/8" Sector Shaft
999064	Complete Conversion Kit, Small Block 318/340/360 Engine, 1-1/4" Sector Shaft
999065	Complete Conversion Kit, Big Block 383/440 Engine, 1-1/8" Sector Shaft
999066	Complete Conversion Kit, Big Block 383/440 Engine, 1/4" Sector Shaft
036425	Steering Column Adapter for Factory Columns to 800126/800127 Box
034925	Steering Column Adapter for Aftermarket Columns to 800126/800127 Box
925121	Fitting Adapter Set, Adapts Conversion Box to -6AN Fitting
925113	Power Steering Hose Kit, Saginaw Pump to Mopar Conversion Box
800337	Pump Kit, Includes Pump, Bracket & Pulley, Small Block 318/340/360
800338	Pump Kit, Includes Pump, Bracket & Pulley, Big Block 383/440
802412	Power Steering Pump Bracket, Mopar 318/340/360, For Saginaw Style Pump
802414	Power Steering Pump Bracket, Mopar 383/440, For Saginaw Style Pump

#### 800126/800127 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual.
Pitman Shaft	1-1/8" or 1-1/4" with 32 splines and 4 master splines
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended



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### Power Box Size Comparison

Stock Power Box

#800126 Box



# 1958-64 CHEVY CAR

## Modern Power Steering Conversion

Borgeson now offers a modern integral power steering conversion for your 1958-1964 full size Chevy. The Borgeson conversion box is a remanufactured GM Delphi 600 integral power steering gearbox. The Delphi 600 represents the latest generation of integral power steering gearbox technology with true modern power steering feel, feedback and a quick 14:1 ratio.

Borgeson has remanufactured this box to bolt directly to the factory mounting location and to fit the stock pitman arm. This box has been positioned to clear the larger four core radiators. The idler arm will need to be rotated to match the new angle of the steering box. A new universal joint and steering shaft will be required for connection to the stock column. Cars with factory power steering will require a drag link adapter or a manual center link.

348/409 Applications will require use of a remote style power steering pump.

### 1958-1964 CHEVY IMPALA

#### Part # Description

#### Power Steering Conversion Box & Accessories

800106	58-64 Chevy Remanufactured Delphi 600, Power Conversion Box
990007	58-64 Chevy Drag Link Adapter for cars with factory power steering
013446	Universal Joint, 3/4"-36 X 17MM DD For connection to power box
409216	Steering Shaft, 3/4"-36 Spline connects 013446 Joint to stock column

#### Complete Power Steering Conversion Kits

999014	58-64 Power Conversion Kit SBC/SWP, Stock Column
999015	58-64 Power Conversion Kit Box, Joint and Shaft Only

### 800106 SPECIFICATIONS

Input Shaft	17MM-DD, 17MM Round shaft with two flat sides.
Pitman Shaft	GM Manual, 1-1/8" with 32 splines and 4 master splines
Pressure Port	M18 X 1.5 O-Ring or 11/16"-18 Flare, if using included flare inserts
Return Port	M16 X 1.5 O-Ring or 5/8"-18 Flare, if using included flare inserts
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.5-3.0 GPM Flow rate recommended



#999014 Conversion Kit



OFFICIAL STEERING  
COMPONENTS OF THE  
NATIONAL STREET  
ROD ASSOCIATION



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# 1962-66 CHEVY II

## 1962-1966 Modern Power Steering Conversion (Floor Shift Only)

Borgeson offers a modern quick ratio power steering conversion box for your 1962-1966 Chevy II Nova. Borgeson has remanufactured this box to bolt directly to the factory mounting location and to fit the stock steering linkage without any interference or modification of the frame or shock tower. **The original factory column will need to be shortened for clearance of the power steering box.** Cars with factory power steering will require either a drag link adapter or a manual steering center link.

### IMPORTANT INSTALLATION NOTES:

- Power conversion box is intended for use with stock steering columns only.
- **Floor Shift Only.** Any stock column can be modified to fit, however column shift is not possible with added length of steering box.
- Borgeson vibration reducing column shaft #990041 is recommended for installation.

### 1962-1966 CHEVY II POWER CONVERSION

#### Part# Description

800117	Power Steering Conversion Box, 62-66 Chevy II Nova
990041	Steering Column Shaft for Power Conversion 62-66 Chevy II Nova
925108	P/S Hose Kit, Rubber, Conversion box to Saginaw pump
990005	62-66 Nova Manual Drag Link Adapter for cars with factory P/S

### 800117 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual.
Pitman Shaft	GM Manual, 1-1/8" with 32 splines and 4 master splines
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended



#800117 Conversion Box

#990041 Column Shaft



## Modern Power Steering Conversion

Borgeson offers an integral power steering conversion for your 1955-1957 Chevy. The Borgeson conversion box is a remanufactured GM Delphi 600 integral power steering gearbox. The Delphi 600 represents the latest generation of integral power steering gearbox technology with true modern power steering feel, feedback and a sporty 12.7:1 ratio. Borgeson has remanufactured this box to bolt directly to the factory mounting location and to fit the stock pitman arm. Conversion requires shortening the stock steering column. (Details below)

Cars with factory power steering will require drag link adapter #990001 or manual steering linkage.

### STEERING COLUMN MODIFICATIONS

**Floor shift** cars with stock column will need to trim the outer column tube back to the firewall. Replacement steering column shaft #990008 can then be used with rag joint #055034 to connect to the conversion box.

**Column shift** cars with stock column will require extensive modifications and sectioning. We have available pre-shortened stock columns for the 55-56 and 57 cars. Shortened stock columns require rag joint #055049 to connect to the conversion box.

**Aftermarket columns.** The available direct replacement aftermarket columns are the proper length to use with our box and will connect with either rag joint #055034 or #055052 depending on the column shaft.

### 1955-1957 CHEVY

#### Part # Description

#### Column Floor Mounts & Column Shaft

909011	55-57 Chevy Deluxe Floor Mount for 2" Column
909012	55-57 Chevy Deluxe Floor Mount Polished for 2" Column
909017	55-57 Chevy Economy Floor Mount for 2" Column
990008	Replacement Column Shaft for 55-57 Chevy Fits stock wheel, 3/4"-36 Splined

#### Power Steering Conversion Box & Accessories

800105	55-57 Chevy Delphi 600 Gear Power Steering Conversion Box
990001	55-57 Chevy Manual Drag Link Adapter for cars with factory power steering
055034	Rag Joint, 18MM-DD X 3/4-36, Power Box to 3/4"-36 Spline column
055052	Rag Joint, 18MM-DD X 1"-DD, Power Box to 1"-DD column
925103	2 Piece Rubber P/S Hose Kit, GM Pump to GM Box

#### Complete Power Steering Conversion Kits

999009	55-57 Power Conversion Kit SBC, Front Motor Mounts, 3/4"-36 Column
999010	55-57 Power Conversion Kit SBC, Front Motor Mounts, 1"-DD Column
999005	55-57 Power Conversion Kit SBC/SWP, 3/4"-36 Column
999006	55-57 Power Conversion Kit SBC/SWP, 1"-DD Column

### 800105 SPECIFICATIONS

Input Shaft	18MM-DD, 18MM Round shaft with two flat sides
Pitman Shaft	GM Manual, 1-1/8" with 32 splines and 4 master spline
Pressure Port	M18 X 1.5 O-Ring or 11/16"-18 Flare, if using included flare inserts
Return Port	M16 X 1.5 O-Ring or 5/8"-18 Flare, if using included flare inserts
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.5-3.0 GPM Flow rate recommended

## Saginaw Manual Box Rebuild Kits

These major rebuild kits include all necessary components to completely rebuild your original Tri-5 manual steering box. Kits are available in two different ratios with your choice of original long input shaft or a shortened input shaft for use with aftermarket steering columns. Will require some specialty tools. Instructions included.

### 1955-1957 CHEVY MANUAL BOX REBUILD KITS

#### Part # Description

921012	55-57 Chevy, Manual Rebuild Kit, 24:1 Ratio, Long Input
921013	55-57 Chevy, Manual Rebuild Kit, 16:1 Ratio, Long Input
921014	55-57 Chevy, Manual Rebuild Kit, 24:1 Ratio 3/4-30 Spline, Short Input
921015	55-57 Chevy, Manual Rebuild Kit, 16:1 Ratio 3/4-36 Spline, Short Input



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#999005 Conversion Kit.

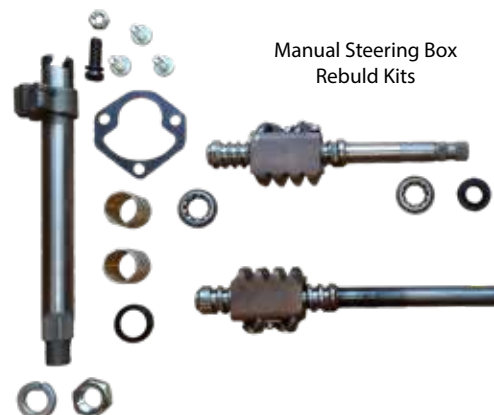
#909017 Economy Floor Mount



#909012 Deluxe Floor Mount



#990001 Drag Link Adapter



Manual Steering Box Rebuild Kits



# 1963-82 CORVETTE

## Corvette Modern Power Steering Conversion

Borgeson offers a modern integral power steering conversion for your 1963-1982 classic Corvette. The Borgeson conversion box is a remanufactured GM Delphi 600 integral power steering gearbox. The Delphi 600 represents the latest generation of integral power steering gearbox technology with true modern power steering feel, feedback and a sporty 12.7:1 ratio. Borgeson has remanufactured this box to bolt directly to the factory mounting location and to fit the stock pitman arm. The factory column will need to be collapsed or shortened approximately 2.5" for clearance of conversion box. (Details below)

Cars with factory power steering will require drag link adapter #990002 or manual steering linkage.

### STEERING COLUMN MODIFICATIONS

**1963-1966** Cars will need to trim approximately 2.5" off the splined steering column shaft for installation. Conversion box will then connect to the stock column with rag joint #055034 (Must leave 3/4" of spline to properly engage the rag joint)

**1967-1982** Cars have a factory collapsible steering column. Gently tap on the spline column shaft with a rubber mallet to collapse the shaft in on itself for the needed 2.5" of clearance. Conversion box will then connect to column with rag joint #055043.

### 1963-1982 CORVETTE POWER CONVERSION

Part #	Description
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Power Steering Conversion Box & Accessories	
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800108	63-82 Corvette Delphi 600 Gear Power Steering Conversion Box
990002	63-82 Corvette Manual Drag Link Adapter for cars with factory power steering
055034	Rag Joint 18MM-DD X 3/4-36 for connection of Box to 3/4"-36 Spline column
055043	Rag Joint 18MM-DD X 1"-48 for connection of Box to 1"-48 Spline column
925103	2 Piece Rubber P/S Hose Kit, GM Pump to GM Box
801005	Corvette P/S Pump Pulley, 2-Row Keyway Style, Big Block Corvette
802408	Corvette P/S Pump Bracket, Steel, Big Block Corvette

Complete Power Steering Conversion Kits	
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999016	63-66 Power Conversion Kit, Small Block with Manual Steering and Stock Column
999017	67-82 Power Conversion Kit. Small Block with Manual Steering and Stock Column
999031	63-66 Power Conversion Kit, For Cars with Factory Power Steering
999032	67-82 Power Conversion Kit, For Cars with Factory Power Steering

### 800108 SPECIFICATIONS

Input Shaft	18MM-DD, 18MM Round shaft with two flat sides
Pitman Shaft	GM Manual, 1-1/8" with 32 splines and 4 master splines
Pressure Port	M18 X 1.5 O-Ring or 11/16"-18 Flare, if using included flare inserts
Return Port	M16 X 1.5 O-Ring or 5/8"-18 Flare, if using included flare inserts
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.5-3.0 GPM Flow rate recommended



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## OEM Corvette Manual Boxes & Rebuild Kits

Borgeson is now the OEM manufacturer of Saginaw manual steering gears for the 1963-1982 Corvettes. Borgeson has both new OEM boxes and OEM complete steering box rebuild kits. Borgeson steering boxes are assembled to the same demanding standards as our precision U-joints. Each box is carefully assembled, adjusted and inspected to our factory specifications.

### 1963-1982 CORVETTE MANUAL BOXES

Part #	Description
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920038	68-82 Corvette, New OEM Manual Steering Box, 3/4-30 Spline
920039	63-67 Corvette, New OEM Manual Steering Box, 3/4-36 Spline
921038	Complete Rebuild Kit, 68-82 Corvette, 3/4-30 Spline
921039	Complete Rebuild Kit, 63-67 Corvette, 3/4-36 Spline



#800108 Conversion Box



#999032 Conversion Kit



Corvette Rebuild Kit



#920038 Manual Box



## 1965-1970 Power Steering Conversions

Borgeson offers modern integral power steering conversions for 1965-1970 classic Mustangs. The Borgeson conversion box is a new manufactured modern integral power steering gearbox. The Borgeson integral power steering gearbox provides true modern power steering feel, feedback and a quick 14:1 ratio. Borgeson has manufactured this box to bolt directly to the factory mounting location and to fit the stock pitman arm. The column will need to be collapsed or shortened for clearance of conversion box. (Details below) Factory power steering cars will require either manual drag link #990050 or drag link adapter #990003

**NOTE: 1967 Mustang owners must measure the sector shaft to see if it is 1" or 1-1/8" prior to purchase.**

**NOTE: Conversion box will not fit with factory clutch linkage. Requires aftermarket linkage designed to clear Borgeson box.**

### STEERING COLUMN MODIFICATIONS

**1965-1967** Cars will need to trim the outer column tube for clearance of the rag joint and use replacement inner column shaft #990040. Conversion box will then connect to the stock column with rag joint #052534

**1968-1970** Cars have a factory collapsible steering column. Gently tap on the rag joint flange with a rubber mallet to collapse the shaft in on itself for the needed clearance. Conversion box will then connect to column with half rag joint #990016.

## 1971-1973 Power Steering Upgrade

Borgeson now offers a modern Delphi 600 series power steering upgrade for the 1971-1973 classic Mustangs. The Borgeson upgrade is a remanufactured modern Delphi 600 series power steering gearbox with true modern power steering feel, feedback and a quick 14:1 ratio. Installation requires our #990018 rag joint connector and either #925118 or #925119 power steering hose kit.

### 1965-1970 COMPLETE CONVERSION KITS

Part #	Description
999020	1965-66 Mustang with Manual Steering and 289/302/351 W
999021	1968-70 Mustang with Manual Steering and 289/302/351 W
999023	1965-66 Mustang with Power Steering and V-8
999024	1968-70 Mustang with Power Steering V-8
999026	1965-66 Mustang with Manual Steering and 200/250 I-6

### 800110/800111 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual
Pitman Shaft	Ford 1" or 1-1/8" with 32 splines and 4 master splines
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended

#999020 Conversion Kit



### 1965-1973 POWER BOX & COMPONENTS

Part#	Description
800110	Power Steering Conversion Box with 1" Sector Shaft, '65-'67
800111	Power Steering Conversion Box with 1-1/8" Sector Shaft, '67-'70
800128	Power Steering Upgrade Box for 1971-1973 Mustangs
990040	65-67 Replacement Column Shaft with Floor mount
052534	Complete Rag Joint for 65-67 Mustang with Conversion Box
990016	1/2 Rag Joint for 68-70 Mustang with Conversion Box
990018	1/2 Rag Joint for 71-73 Mustangs with Upgrade Box
925107	Hose Kit, Borgeson 800110/800111 Box to Ford Pump V-8
925108	Hose Kit, Borgeson 800110/800111 Box to Saginaw pump V-8
925109	Hose Kit, Borgeson 800110/800111 Box to Ford Pump I-6
925110	Hose Kit, Borgeson 800110/800111 Box to Saginaw Pump I-6
925118	Hose Kit, Borgeson 800128 Box to Ford Pump V-8
925119	Hose Kit, Borgeson 800128 Box to Saginaw Pump V-8
990051	65-66 Clutch Z-Bar to clear power conversion box 289/302/351 W
800330	289/302/351W P/S Pump upgrade includes: pump, bracket & pulley
800336	390/428 FE P/S Pump upgrade includes: pump, bracket & pulley
800334	200/250 I-6 P/S Pump upgrade includes: pump, bracket & pulley
990003	67-70 Mustang Drag Link Adapter, Replaces Control Valve

#990051 Manual Clutch Linkage



## 1979-2014 Mustang Steering Shafts

Borgeson makes direct replacement steering assemblies for 79-04 Mustangs. The factory rag joint is eliminated in all assemblies.

### 1979-2001 MUSTANG STEERING SHAFTS

Manual	Power	Description
N/A	000652	05-14 Rack to OEM Column with Vibration Reducer
000655	000656	79-93 Steel without Vibration Reducer
000657	000658	79-93 Steel, with Vibration Reducer
N/A	000650	94-04 Rack to OEM Column without Vibration Reducer
N/A	000651	94-04 Rack to OEM Column with Vibration Reducer

# 1952-64 FORD FULL SIZE CAR

## Modern Power Steering Conversion

Borgeson has developed an integral power steering conversion box for the 1952-1964 Ford full size cars. The Borgeson conversion box is a new manufactured modern integral power steering gearbox. The Borgeson integral power steering gearbox provides true modern power steering feel, feedback and a quick 14:1 ratio. Borgeson has manufactured this box to bolt directly to the factory mounting location and connects to the stock manual steering linkage. The steering column will need to be shortened for installation of this conversion box. (Details below)

**Note:** Cars with factory Bendix style power steering will require either manual steering linkage or a drag link adapter.

### STEERING COLUMN MODIFICATIONS

**1952-1957 & All Column Shift** cars a steel coupler #312500 must be welded to a cut off inner column shaft. The outer column tube will be able to fit over the coupler leaving enough column tube to mount the shift linkage.

**Note:** Will not fit 3-Speed manual column shift cars.

**Note:** Due to the lack of a vibration reducer the solid coupler connection will allow some amount of hydraulic noise to pass up to the steering wheel.

**1958-1964 For floor shift** applications we recommend the use of a rag joint #052549. The cut off column shaft will need to be ground into a DD profile to connect to the rag joint.

**This conversion box fits the following Ford full size models:**

- 1952-1956 Crestline, Customline, Mainline
- 1957-1960 Custom
- 1957-1962 Fairlane
- 1958-1964 Galaxie
- 1955-1957 Thunderbird

**Box will also fit Mercury vehicles sharing the same platform.**

### 1952-64 FORD FULL SIZE

Part#	Description
800115	Ford Full Sized Power Conversion Box
CALL	Complete Conversion Kit, Full Size Ford with Manual Steering, 292/312 Y-Block Only
CALL	Complete Conversion Kit, Full Size Ford with Manual Steering, 289/302/351W Only
800335	P/S Pump Upgrade, 292/312 Y-Block, Includes Pump, Bracket and Pulley
800330	P/S Pump Upgrade, 289/302/351W, Includes Pump, Bracket and Pulley
800336	P/S Pump Upgrade, FE390/428, Includes Pump, Bracket and Pulley
925108	Power Steering Hose Kit, 2-Pc Rubber, GM Pump to Conversion Box V-8 Only
925121	Steering Box Hose Adapter Set-6AN (Required for custom hose applications)
801150	2-Row Add-On Crank Pulley, Adds 2nd Row for P/S on 292/312 Y-Block
990004	Manual Drag Link Adapter for 1961-1964 Full Sized Ford Only
802409	Power Steering Pump Bracket, Steel, Ford 289/302/351W, Saginaw Style Pump
802411	Power Steering Pump Bracket, Steel, Ford 292/312 Y-Block, Saginaw Style Pump
052549	Rag Joint Coupler 1 1/4"-36 x 3/4"-DD
312500	Steel Coupler 1 1/4"-36 x 3/4" Smooth

### 800115 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual
Pitman Shaft	1-1/8" Ford with 32 splines and 4 master splines
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended

THE PREFERRED STEERING OF



#800115  
Conversion Box



#990004  
Manual Drag  
Link Adapter

Conversion Kit  
292/312 Y-Block



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# 1964-77 FORD MID SIZE CAR

## Modern Power Steering Conversion

Borgeson offers an integral power steering conversion for your 1964-1977 Ford mid size. The Borgeson conversion box is a new manufactured modern integral power steering gearbox. The Borgeson integral power steering gearbox provides true modern power steering feel, feedback and a quick 14:1 ratio. Borgeson has manufactured this box to bolt directly to the factory mounting location and to fit the stock pitman arm. The column will need to be collapsed or shortened for clearance of conversion box. (Details below)

Cars with factory Bendix style power steering will require either manual steering linkage or a drag link adapter.

### STEERING COLUMN MODIFICATIONS

**Stock column shift** cars have variations throughout the years. We have not done in house fitting on column shift cars. Installations have been completed using our #312500 coupler. This fits within the column tube and may leave room for the factory shift linkage.

**Note:** Due to the lack of a vibration reducer the solid coupler connection will allow some amount of hydraulic noise to pass up to the steering wheel.

**1964-1967 floor shift** applications, you will need to trim away the outer column tube and cut off the inner steering column shaft. The column shaft will need to be ground into a DD profile to connect to rag joint #052549.

**1968-1977 floor shift** applications, you will need to trim away the outer column tube. The inner steering column shaft with rag joint flange will then collapse in on itself for clearance. Attach the shortened column to the box with half rag joint part #990016.

**This conversion box will fit the following years and models:**

- 1964-1970 Ford Fairlane
- 1966-1970 Ford Falcon\*\*
- 1966-1970 Ford Ranchero & Falcon Ranchero
- 1968-1971 Ford Torino & Gran Torino
- 1970-1977 Ford Maverick

Box will also fit Mercury vehicles sharing the same platform.

\*\*1960-1965 Falcons use either our #800110 or #800111, call for details.

### 1964-77 FORD MID SIZE CARS

Part #	Description
800114	Ford Mid-Sized Power Conversion Box
800330	P/S Pump Upgrade, 289/302/351W, Includes Pump, Bracket and Pulley
800336	P/S Pump Upgrade, FE 390/428 P/S, Includes Pump, Bracket and Pulley
999052	Complete Conversion Kit, 1968-1977 with Manual Steering, 289/302/351W Only
999053	Complete Conversion Kit, 1968-1977 with Power Steering, Small Block & Big Block
800334	P/S Pump Upgrade, I-6 200/250, Includes Pump, Bracket and Pulley
802409	Power Steering Pump Bracket, Steel, Ford 289/302/351W, Saginaw Style Pump
802410	Power Steering Pump Bracket, Steel, Ford 200/250, Saginaw Style Pump
925107	Power Steering Hose Kit, 2 Pc Rubber, Ford Pump to Conversion Box, V-8 Only
925108	Power Steering Hose Kit, 2 Pc Rubber, GM Pump to Conversion Box, V-8 Only
925109	Power Steering Hose Kit, 2 Pc Rubber, Ford Pump to Conversion Box, I-6 Only
925110	Power Steering Hose Kit, 2 Pc Rubber, GM Pump to Conversion Box, I-6 Only
925121	Steering Box Hose Adapter Set-6AN (Required for custom hose applications)
990003	Manual Drag Link Adapter, Mid-Sized Ford
990016	Steering Coupler, 1/2 Rag Joint, Steering Box Side, 11/16-36 Spline, With Disc
052549	Rag Joint Coupler 1 1/16"-36 x 3/4"-DD

### 800114 SPECIFICATIONS

Input Shaft	11/16"-36 Spline, .685-.690 actual
Pitman Shaft	1-1/8" Ford with 32 splines and 4 master splines
Pressure Port	M16 X 1.5 Flare Located closest to engine
Return Port	M16 X 1.5 Flare Located closest to input shaft
Maximum Pressure	1450 PSI Maximum operating pressure, 1100-1250 PSI Optimal
Flow Rate	2.0-2.5 GPM Flow rate recommended



#800114 Power Conversion Box



#999052 Complete Conversion Kit



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# 1970-14 FORD TRUCK

If you have tried replacing the worn-out steering on your Ford, you've probably found that many OEM replacement steering assemblies are no longer available. Borgeson manufactures heavy duty bolt-in replacement assemblies for many model years of Ford pickups and Broncos.

## FORD TRUCK STEERING ASSEMBLIES

Part #	Description
000302	04-10 Ford F150 Lower Shaft
000303	04-10 Ford F150 Upper Shaft
000304	11-14 Ford F150 Lower Shaft
000305	11-14 Ford F150 Upper Shaft
000306	99-07 Ford Super Duty, F250, F350
000307	08 Ford Super Duty F250 (Built Prior to 7/30/2007) Lower Shaft
000308	08-16 Ford Super Duty, F250, F350, F450 Lower Shaft
000309	08-16 Ford Super Duty, F250, F350, F450 Upper Shaft
000970	70-79 Full Size Pickup
000975	70-79 Full Size Pickup with Vibration Reducer Upgrade
000977	78-79 F150, F250, Bronco with Rag Joint Flange
000941	Replacement Rubber Rag Joint and Hardware
000980	80-91 Ford Full Size Trucks
000985	80-91 Full Size with Vibration Reducer Upgrade
000981	92-96 Ford F150, F250, F350
000983	97-04 Ford F150, '97-'99 F250



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Part #000941

# 1966-1977 BRONCO

## Bronco Power Steering Box & Components

Borgeson offers an integral power steering conversion for your 1966-1977 Bronco. The Borgeson conversion box is a modern power steering gearbox that has been modified to bolt directly to the factory mounting location and to fit the stock pitman arm. A new universal joint will be required for connection to the stock column and a new hose kit for connection to the pump of your choice. Complete kits are available for the most popular applications.

## 1966-1977 BRONCO STEERING

Part #	Description
<b>Replacement Steering Shafts</b>	
000973	66-75 Bronco, Manual Steering (Column must be modified)
000976	73-75 Bronco, Power Steering (Rag Joint Column)
<b>Power Steering Conversion Box &amp; Accessories</b>	
800125	66-77 Bronco Modern Power Steering Conversion Box
999059	66-77 Bronco Power Conversion Kit SBF 289/302/351W
999060	66-77 Bronco Power Conversion Kit 200/250 In-Line 6 Cylinder
014925	Universal Joint 3/4"-DD to 11/16"-36 Conversion Box Only
000820	76-77 Bronco Steering Shaft with Borgeson Conversion Box
000821	66-75 Bronco Steering Shaft M/S with Borgeson Conversion Box
000822	73-75 Bronco Steering Shaft P/S with Borgeson Conversion Box
925111	2 Piece Rubber P/S Hose Kit, Ford Pump to Conversion Box
925112	2 Piece Rubber P/S Hose Kit, Saginaw Pump to Conversion Box
800330	SBF Saginaw P/S Pump upgrade Includes: pump, bracket and pulley
800334	Ford I-6 Saginaw P/S Pump upgrade Includes: pump, bracket and pulley



#999059  
Bronco Kit

## 1972-1986 Jeep CJ 1987-2019 Wrangler 1974-2000 Jeep Trucks

Jeep's original steering shaft assemblies were not designed for the added stress of body lifts and oversized tires. Borgeson's replacement assemblies offer a heavy duty telescoping shaft with either two precision needle bearing U-joints or a vibration reducer and a U-joint.

### JEEP STEERING SHAFTS

Part #	Description
000903	72-75 Jeep CJ, Manual Steering
000904	72-75 Jeep CJ, Power Steering
000905	76-86 Jeep CJ, Manual Steering
000910	76-86 Jeep CJ, Power Steering
000915	76-86 Jeep CJ, Manual Steering with Vibration Reducer Upgrade
000920	76-86 Jeep CJ, Power Steering with Vibration Reducer Upgrade
000925	87-95 Jeep Wrangler, Power & Manual Steering
000926	87-95 Jeep Wrangler, Power & Manual Steering without Vibration Reducer
000890	74-83 Jeep Cherokee (SJ) Power Steering with Rag Joint Flange
000890	74-91 Jeep Wagoneer (SJ) Power Steering with Rag Joint Flange
000941	Replacement Rubber Rag Joint Disc with Hardware
000893	84-96 Jeep Cherokee/Wagoneer (XJ)
000894	97-00 Jeep Cherokee/Wagoneer (XJ)
000896	92-95 Jeep Grand Cherokee (ZJ)
000872	97-00 Jeep Wrangler TJ Upper Shaft
000873	01-06 Jeep Wrangler TJ Upper Shaft
000874	97-02 Jeep Wrangler TJ Manual Steering Lower Shaft
000875	97-02 Jeep Wrangler TJ Power Steering Lower Shaft
000876	03-06 Jeep Wrangler TJ Power & Manual Steering Lower Shaft
000311	07-19 Jeep Wrangler JK Lower Steering Shaft
000312	07-19 Jeep Wrangler JK Upper Steering Shaft



**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) see page 34 for details.

## 1972-02 JEEP BOXES & PUMPS

Borgeson steering boxes & pumps are assembled to the same demanding standards as our precision U-joints, far surpassing the OEM standards. Each box is chemically cleaned, inspected and refinished. All components are thoroughly inspected and replaced or re-machined as needed. Each is then carefully assembled, adjusted and inspected to our factory specifications.

### JEEP STEERING BOXES & PUMPS

Part #	Description
<b>Jeep Steering Boxes</b>	
920055	1972-86 Jeep CJ, New OEM Replacement Manual Steering Box
920010	1987-02 Jeep Wrangler, New OEM Manual Steering Box
800130	1987-95 Jeep Wrangler, New Quick Ratio Power Box, 12.7:1 Ratio
<b>Jeep Power Steering Pumps</b>	
800324	1972-1974 Jeep CJ5, CJ6, Wagoneer Power Steering Pump
800325	1975-1983 Jeep CJ5, CJ7 Power Steering Pump
800326	1983-1990 Jeep Cherokee & Wagoneer Power Steering Pump
800323	P/S Pump Press-On style with two returns for Hydro-Boost





# 1979-19 DODGE TRUCK

## Dodge Full Size Truck Shafts

Full size Dodge Pickups and Ramchargers have a type of steering coupler that has shown signs of wear in as little as 4000 miles, depending on how the truck is used. This wear causes play in the truck's steering. It's even more noticeable if your truck is used for plowing, towing or if oversized tires have been installed. The Borgeson steering shaft assembly replaces the loose OEM parts with precision needle bearing U-joints and a telescopic shaft.

### DODGE PICK-UP STEERING ASSEMBLIES

Part #	Description
000940	79-93 Full Size Pickups & Ramchargers with Rag Joint Flange
000941	Replacement Rubber Rag Joint with Hardware
000943	79-93 Extreme-Duty 2-Joint System (verify Column*)
000945	94 Full Size Pickups 2WD & 4WD
000950	95-02 Full Size Pickups 2WD & 4WD
000951	03-08 2500 & 3500 4WD Models
000952	03-13 Ram 1500 2WD & 4WD, 03-13 Ram 2500 2WD, 03-12 Ram 3500 2WD
000951	06-08 1500 4WD Mega Cab
000953	14-19 Ram 1500 2WD & 4WD
000954	09-19 Ram 2500 & 3500 4WD, 14-19 Ram 2500 2WD, 13-19 Ram 3500 2WD

**\*Column must have Removable Rag Joint**



Part #000941



**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) see page 34 for details.

## DODGE POWER STEERING UPGRADES

### Borgeson 1994-02 Hi-Flow P/S Pump

**Part #800328** is manufactured from *all new components*. This is a direct replacement Hi-Flow power steering pump for the 1994-2002 Dodge Ram 2500 & 3500 trucks with the Cummins Turbo Diesel motor. This pump has the output pressure/flow calibrated to 1450-1550 PSI and 3.5 GPM to provide your Ram with all of the power its steering needs. Includes new powder coated reservoir, cap and drive key.

Part # 800328



### Borgeson Dodge Box for 2003-08

**Part #800123** Borgeson has sourced and adapted this brand new massive "6-bolt" power steering box for the 2003-2008 Dodge trucks. This box has a massive pitman shaft with the largest bearing available for support. The top of the pitman shaft is supported by a 6-bolt top cover for ultimate pitman shaft stability. The Borgeson "Dodge Box" offers the largest piston diameter for the most available power assist and a modern variable valve that allows for stable highway driving and effortless parking and maneuvering. *This box has a pitman shaft that is compatible with all OEM and dropped pitman arms that fit the stock box.*

### Borgeson Dodge Box for 2009-19

**Part #800124** Borgeson direct replacement power steering box for the 2009-2019 Dodge Ram 2500 and 3500 4WD trucks. Fits factory original pitman arm and hoses. For use with either factory steering shaft or Borgeson Heavy Duty replacement.

Part # 800123, 03-08 Dodge Box



### DODGE POWER STEERING

Part #	Description
800123	03-08 Dodge Box Power Steering Box Upgrade
800124	09-19 Borgeson Direct Factory Replacement Steering Box
800328	P/S Pump Upgrade for 94-02 Dodge Trucks with Cummins Diesel
925116	P/S Hose kit for 94-96 Dodge Diesel Trucks with Vacuum Brakes
925117	P/S Hose Kit for 97-02 Dodge Diesel Trucks with Hydro-Boost Brakes

# 1963-19 CHEVY/GMC TRUCK

## 1973-1994 Chevy & GMC

### Full Size Trucks and SUVs

Factory steering shafts for many GM models are no longer available from GM, but your worn out steering shafts can now be replaced. A Borgeson heavy-duty truck assembly will fix that wandering steering for good.

### EXTREME-DUTY

#### TWO-JOINT STEERING ASSEMBLY 1973-1994

A two-joint system that eliminates the factory rag joint is also available. You should use the two-joint system if you use your truck for extra heavy-duty off-roading or have a body lift installed.

## 1999-2008 Chevy & GMC

### Full Size Trucks and SUVs

You may already have experienced a "clunking or ratcheting" feel in the steering of your 1999-2008 Chevy truck. Borgeson's direct replacement assembly is a permanent solution to the problem.

#### CHEVY & GMC FULL SIZE STEERING ASSEMBLIES

Part #	Description
000301	95-00 Chevy/GMC Full Size Lower Steering Shaft
000930	73-78 Full Size with Rag Joint Flange
000932	73-76 Extreme-Duty with 2 Universal Joints
000933	77-78 Extreme-Duty with 2 Universal Joints
000934	79-91 Full Size with Rag Joint Flange
000935	79-94 Extreme-Duty with 2 Universal Joints
000936	92-94 with Universal Joint and Complete Rag Joint
000937	99-08 Full Size Truck & SUV Upper Shaft
000938	09-19 Full Size Truck & SUV Upper Shaft
000939	95-98 Full Size Truck & SUV Upper Shaft
000941	Replacement Rubber Rag Joint with Hardware



Part #000941



## Borgeson Street & Performance Power Steering Gears

Borgeson Universal now offers its all new Street & Performance modern quick ratio power steering box to replace the Saginaw/Delphi 800 series in 1963 and up GM Trucks. This all new power steering box has a quick 12.7:1 ratio with firm modern steering feel. The Borgeson Street & Performance power steering box will bolt directly to the stock location and fit to the original power steering pitman arms. Trucks switching from manual steering will require a power steering pitman arm. The steering box includes adapters to be able to use either O-ring or flare style hose connections. This new Borgeson steering box uses a 3/4"-30 spline input shaft and all pre-1977 cars will require a new rag joint connector #990012.

### Borgeson OEM Saginaw Manual Boxes

Borgeson offers the OEM Saginaw manual steering gears for the 1968-1978 Chevy/GMC 2WD trucks. These steering boxes are made in the USA and have a 3 year warranty.

#### CHEVY & GMC STEERING BOXES

Part #	Description
800132	1967-1987 Chevy/GMC, C10 Street & Performance Steering Box
800133	1967-1987 Chevy/GMC, K10 Street & Performance Steering Box
800134	1988-1998 Chevy/GMC, OBS Street & Performance Steering Box
999067	1963-1966 Chevy/GMC, C10 Street & Performance Steering Conversion Kit
920023	1968-1978 Chevy/GMC, Saginaw Manual Steering Box



Part # 800134



Part # 999067



**WARNING:** Cancer and Reproductive Harm -  
www.P65Warnings.ca.gov see page 34 for details.

# STEERING SYSTEM DESIGN

## Steering System Design

Often the steering system is designed late in the building process. We recommend that the steering be mocked up at the time the engine and exhaust components are installed. Positioning of the column, shafts, and U-joints with respect to the engine, exhaust and steering box early on can help in selecting the correct parts. With our wide selection of U-joints, shafts, and vibration reducers, any system can be designed or modified to result in a car that is not only safe, but a pleasure to drive. Keeping a system simple is the best course, but even a system with up to 10 U-joints can be designed as long as the proper phasing and supports are used. **Remember to use a support bearing if more than two joints are used.**

## Shaft Support Placement

Any time more than two universal joints are used in a system, a shaft support is required to prevent the shafts from looping. In a system with 3 U-joints one support is required. For each additional U-joint an additional support will be needed. In a 3 joint system it is best to locate the shaft support as close to the center U-joint as possible. If one of the shafts is significantly longer than the other, it is best to locate the support on the longer shaft.

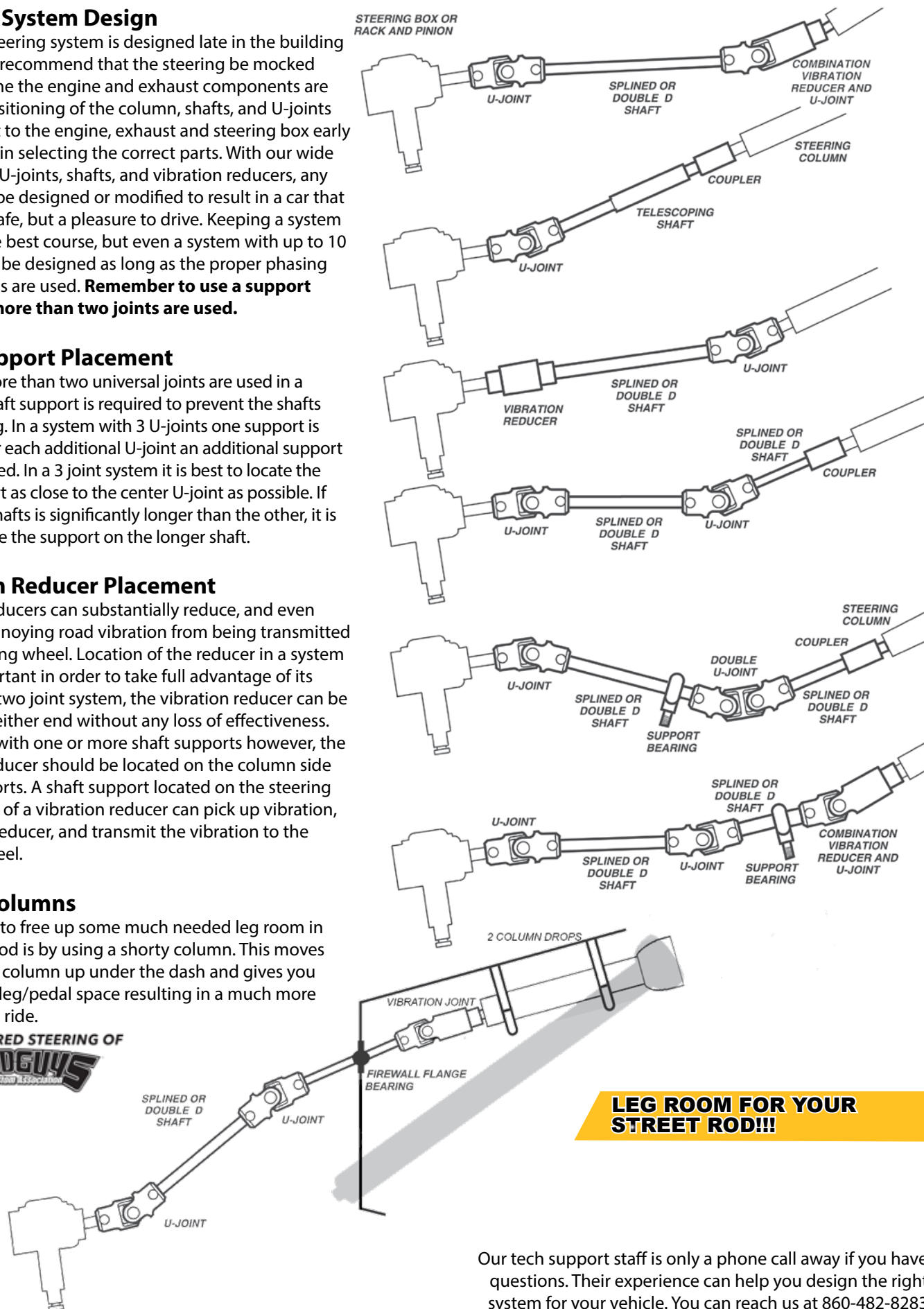
## Vibration Reducer Placement

Vibration reducers can substantially reduce, and even eliminate annoying road vibration from being transmitted to the steering wheel. Location of the reducer in a system is very important in order to take full advantage of its effects. In a two joint system, the vibration reducer can be installed at either end without any loss of effectiveness. In a system with one or more shaft supports however, the vibration reducer should be located on the column side of the supports. A shaft support located on the steering column side of a vibration reducer can pick up vibration, bypass the reducer, and transmit the vibration to the steering wheel.

## Shorty Columns

A great way to free up some much needed leg room in your street rod is by using a shorty column. This moves the steering column up under the dash and gives you much more leg/pedal space resulting in a much more comfortable ride.

THE PREFERRED STEERING OF



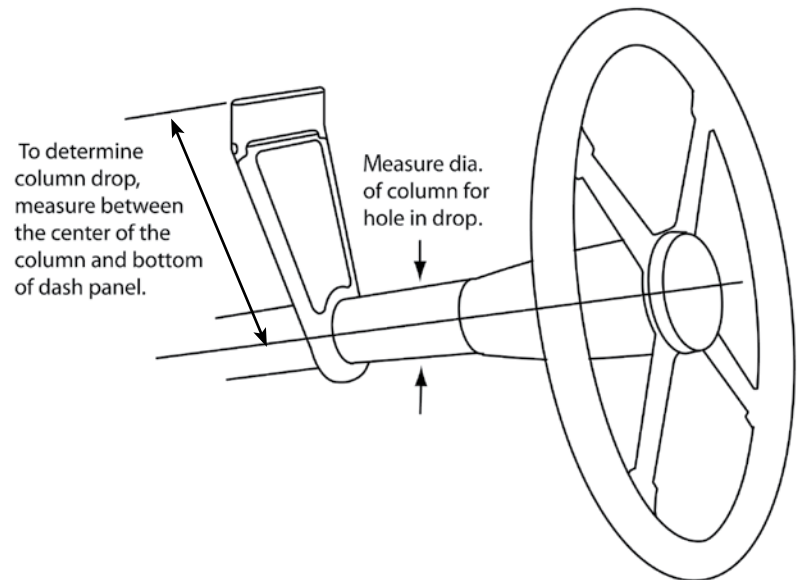
**LEG ROOM FOR YOUR STREET ROD!!!**

Our tech support staff is only a phone call away if you have questions. Their experience can help you design the right system for your vehicle. You can reach us at 860-482-8283 Monday-Friday 8:00 AM to 5:00 PM Eastern Time.



## Steering Column Length and Column Drop Size

Before determining the column length, it is important to have your seat and pedals in the final locations. Using a pie tin tacked to a wooden dowel is an excellent way to decide on steering column position and length. With one person sitting in the car and holding the "steering wheel" in position, another person can take measurements of column length and position. Keep in mind, many traditional style steering wheels are flat, while other aftermarket wheels are dished. This is also the perfect time to determine how much drop you'll need to put the column in a comfortable driving position. Measure from the mounting surface on the dash to the center of the steering column. This is the length of the drop you will need.



## Steering Box Installation Angle

One thing frequently overlooked when building or modifying a car is the position of the steering box. Steering boxes are often positioned with the input shaft level creating a much more complex steering linkage. A great way to simplify your steering linkage is to position the steering box with the input shaft angled up toward the steering column. This method has been used by the OEM's for years to simplify the connection to the steering column.



## Steering Ratio

**Steering box ratio.** This is the relationship between input motion and output motion on the steering box. The ratio is expressed as 24:1, 22:1, 16:1, etc. For example, in a 24:1 ratio box, the pitman shaft rotates one degree for every 24 degrees of input shaft rotation. The higher the first number, the more input shaft rotation is required to get the same amount of output shaft rotation. Dividing the first number in the ratio by four, gives the number of turns lock to lock.

**Steering ratio and effort.** A quicker ratio steering box will have fewer turns of the steering wheel lock-to-lock but this does have an effect on drivability. In manual steering applications a quick ratio box, while enhancing the way the car feels at speed, will greatly increase steering effort during low speed and parking. In power steering applications it is quite common for quicker ratios to be used as the power assist overcomes the added steering effort. Selecting too quick of a ratio without properly building the suspension can result in a diving feel during 5-10 MPH turns.

**Variable Ratio Steering.** True variable ratio steering is accomplished with the gear cut of the sector shaft and rack block inside the steering gear. The center tooth of a variable ratio power steering gear box is cut at a slower ratio, this makes the on center feel and reaction of a variable ratio box more stable at highway speeds. The pitch of the sector shaft gear then changes to a quicker ratio off center. This gives quicker response when more turning is required like parking, yet minimizes the overall turns lock-to-lock.



## Pitman Arm Length

Steering speed can be adjusted by box ratio or pitman arm length. The longer the pitman arm, the quicker the steering will be. That is, a longer pitman arm means less steering wheel movement is required to produce the same amount of front wheel movement. So if you are looking to speed up or slow down the steering, changing the pitman arm is an easy way to do it.

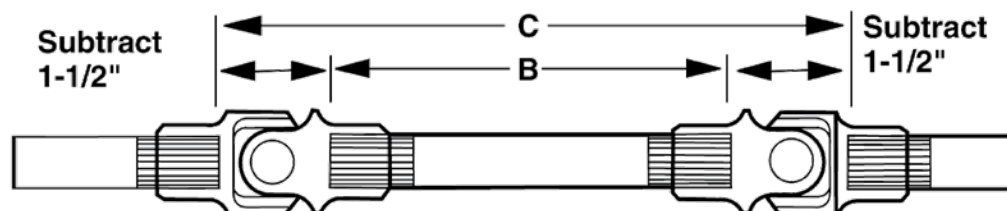
# STEERING SYSTEM DESIGN HOW TO...

## Determine splined shaft length with two U-joints:

1. Measure the distance from the end of the column to the box/rack (Dimension C).
2. Subtract 3" from this measurement.
3. Order the next even size shaft (Dimension B).

Note: We stock stainless and polished stainless shafting in 1/4" increments up to 24"

**EXAMPLE** If "C" is 18" —subtract 3" (1-1/2" for each joint). "B" is 15". Order a 16" shaft and trim a total of 1" from the shaft, either from one or both ends.



## Determine splined shaft length with one U-joint and U-joint/vibration reducer combination.

1. Measure the distance from the end of the column to the box/rack (Dimension C).
2. Subtract 4" from this measurement.
3. Order the next even size shaft (Dimension B).

Note: We stock stainless and polished stainless shafting in 1/4" increments up to 24"

**EXAMPLE** If "C" is 19" —subtract 4" (1-1/2" for a joint and 2-1/2" for the vibration reducer). "B" is 15". Order a 16" shaft and trim 1" from the shaft, either from one or both ends.

## Determine splined shaft length with three or more U-joints.

1. Buy the U-joints first.
2. Install a joint on the column and one on the box/rack.
3. Use dowels or PVC pipe and mock up the system around obstacles.
4. Order the correct shaft lengths based on dowel/PVC lengths.

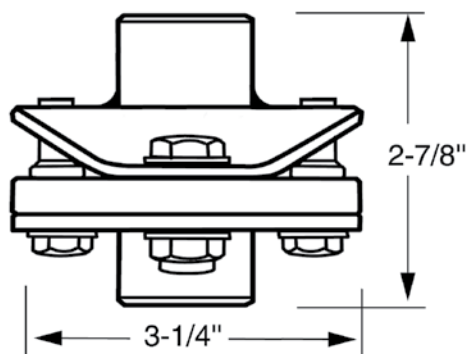
## Add a vibration reducer to an existing steering system.

There are various ways of adding a vibration reducer to a system. Because of the difference in shafts, U-joints, racks, boxes, and columns, we recommend you call our technical support staff. We can suggest options that will result in the best steering system for you.



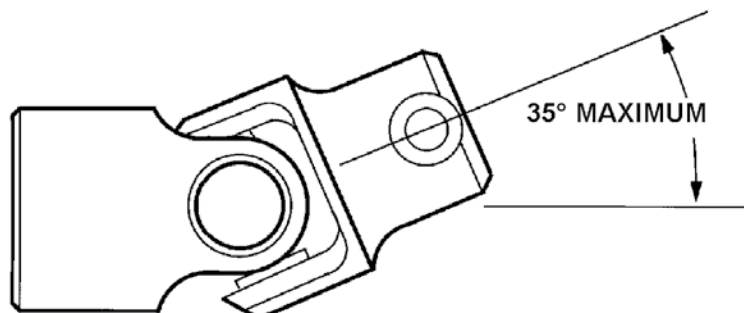
## Rag Joint Angles of Operation

Rag joints are designed to dampen vibrations, they are not designed to accommodate an angle. **If you do not have a straight connection a rag joint should NOT be used.**



## U-joint Angles of Operation

The Borgeson needle bearing U-joints will operate smoothly up to 35°. The double needle bearing U-joints will operate smoothly up to 70°. The U-joints must not be altered in any way. Pin and block style U-joints will operate at 30° smoothly.



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**BORGESON**  
Steering Association

## Splines and Irregular Shapes: the STRONGEST Method.

Detroit uses irregularly shaped shafts such as splined or a Double D configuration and inserts them into a similarly shaped hole with practically no play then secures them by staking or clamping. Since steering failures are practically unheard of in modern production cars, one should strongly consider this method as having significant merit.

Borgeson offers splined shafts and joints which give the option of easy disassembly when repairs on the vehicle become necessary. Another advantage is the ability to rotate the shaft in relation to the U-joint in small increments. This makes it easier to position the U-joints in the correct relationship to each other.

A flat should be filed on the splined shaft where the set screw will clamp (figure A). This will prevent damage to the spline and allow for easier disassembly. **Always lock the set screw with a lock nut, Loc-Tite or similar product.** The shaft must be flush with the inside of the yoke (figure B), not so short that it sacrifices strength or so long that it interferes with the center workings of the joint.

To determine the spline size of a component, measure the outside diameter and count the number of splines. If there is a flat spot on the shaft and some of the splines are missing, (figure C) count halfway around where there are splines and double that number. We need to know how many teeth are in a theoretical full circle. If you have something unusual or you're unsure about measuring the spline, make an impression of it in clay and send it to us.

A Double D (figure D) shaft has two flats on the shaft that correspond to two flats in the female end of the U-joint. The disadvantage of this style is the lack of adjustability because the shaft can only be rotated 180°. The Double D shaft should have a dimple machined on the shaft for the set screw to clamp to (figure D). **Always lock the set screw with a lock nut, Loc-Tite or similar product.**

## Pinning

Common practice is to use two 3/16" diameter roll pins in each yoke at right angles to each other and approximately 3/8" apart. (figure E) An even stronger connection can be made by using hardened shear pins. Pinning can be used when the shaft can be removed from the vehicle and supported properly when inserting the pins. **Driving pins in while the assembly is in the car could cause damage.** The major drawback to pinning is that a 3/4" diameter shaft is weakened by 30%, smaller shafts are weakened to an even greater extent.

If you are considering using bolts instead of roll pins, don't. **NEVER USE BOLTS!** Always use roll pins. Roll pins are driven in and fit very tightly in the drilled hole. Bolts often fit loosely inside the drilled hole and repeated back and forth movement, even though very slight, can cause the bolt to work harden and fail.

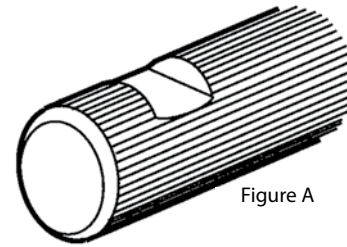


Figure A

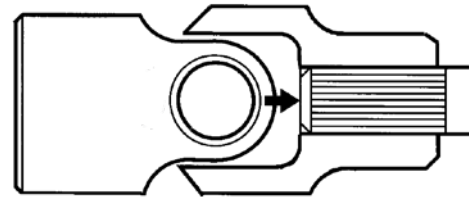


Figure B

Count the number of splines of half the circumference and double that number for total

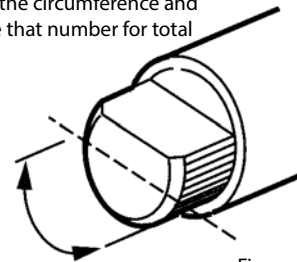


Figure C

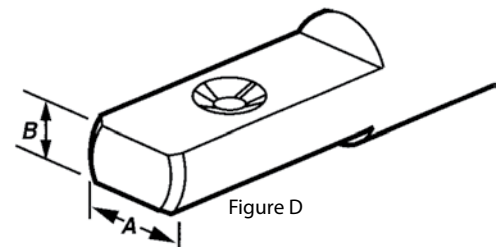


Figure D

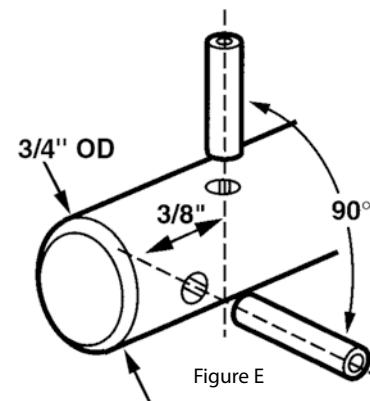


Figure E



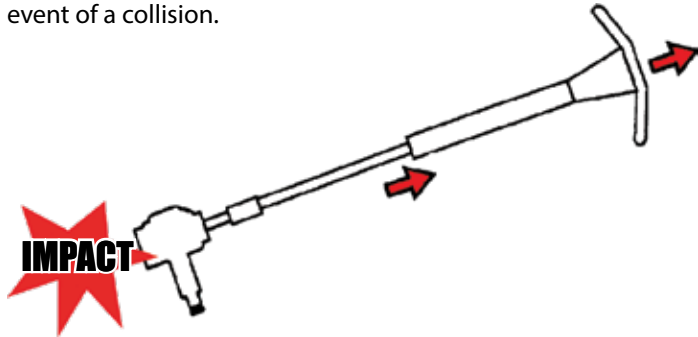
## STEERING SYSTEM DESIGN

### CAUTION: Collapsibility

Every steering system should include some means of directing energy away from the driver in the event of a collision. One method of reducing the chance of this happening is to intentionally design angles into the steering system so that the force of a collision deflects the column away from the driver. A second method is to use the Borgeson telescopic intermediate shaft.

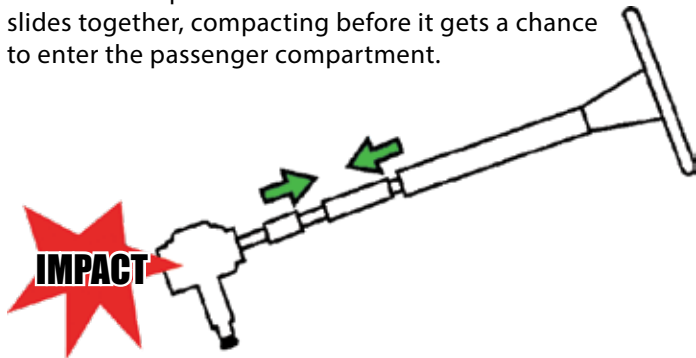
#### Problem:

Here is a straight column *WITHOUT* a collapsible intermediate shaft. Without a collapsible shaft, the column may be forced into the passenger compartment in the event of a collision.



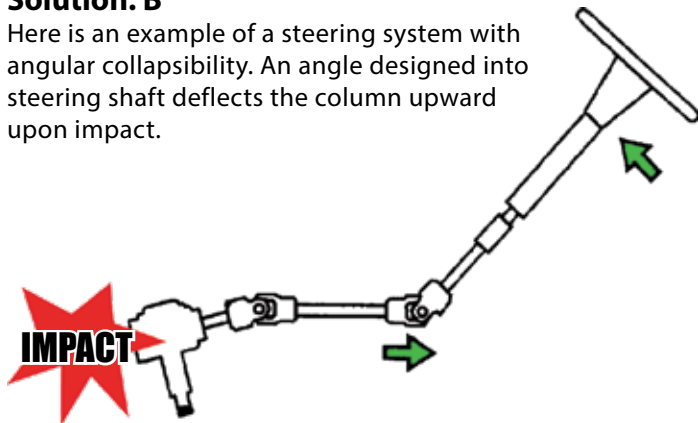
#### Solution: A

With a telescopic intermediate shaft the column slides together, compacting before it gets a chance to enter the passenger compartment.



#### Solution: B

Here is an example of a steering system with angular collapsibility. An angle designed into steering shaft deflects the column upward upon impact.



### CAUTION: Shaft Size

#### BORGESON DOES NOT RECOMMEND USING LESS THAN 3/4" DIAMETER SHAFTS

All Borgeson spline and DD shafts are 3/4" diameter. We will not sell a shaft with a smaller diameter due to safety considerations. A 5/8" shaft is 42% weaker than a 3/4" shaft and can be twisted with a 14" steering wheel.

Borgeson does not recommend using tubing for a steering connection. It is unsafe to pin and there are too many wall thicknesses and alloys available to insure proper strength.

#### U-Joint Orientation

When two joints are used on a shaft, the forks of the yokes closest to each other should be in line, or "in phase." Premature wear or binding can result if the U-joints are not phased properly. Sometimes if the U-joints are at a severe angle, even if they are phased correctly, a hard spot in the steering may occur for no apparent reason. If this happens, index the U-joints two or three splines in one direction. The hard spot should disappear or be minimized.

#### CORRECT PHASING



#### INCORRECT PHASING



### CAUTION: Do Not Use Flex Cable

Another less common (and definitely not recommended) method of getting from the column to the rack or box is to use flex cabling from a Pinto (this cable is no longer available from Ford). Ford only used these for a couple of years before switching to joints and shafts, which should tell you something. When a heavier engine is put into a larger heavier car, a flex cable is not reliable.



### CAUTION: Welding

Welding joints is a common practice in racing, however, it is not a method we at Borgeson would recommend. Hairline cracks, which may be all but invisible to the unaided eye, could cause a weld to fail under severe stress. It may also be illegal in some states to weld steering system components on a car used on the street. Improper grounding can cause damage which will result in the failure of the steering. Overheating, which can occur at relatively low temperatures, can distort the yoke and melt the grease out of the needle bearings or damage the seals. This can prevent the joint from operating freely and it may fail. Cooling a weld too quickly can cause cracks, leading to sudden failure. Also, welding is a permanent connection that makes disassembly almost impossible should it become necessary. **Caution: Welding on steering components is illegal in some states. Check first.**

### CAUTION: Keying and Set Screws

Using a key, as is done in many industrial applications, can transmit power effectively from the shaft to the joint. A key, however, is not suitable to take sudden shock (such as from a pothole or accident) which can distort or shear the key or shaft keyway. This may cause play to develop in the system or, even worse, failure. It should be noted that in industrial applications, keys are designed to shear, preventing damage to expensive components. In automotive applications a sheared key will cause extensive damage by causing a loss of control of the vehicle. **Set screws should never be used to secure smooth bore joints.** They should only be used as a method to prevent a splined or Double D shaft from disengaging from the joint. An indentation or flat should be made for the set screw on splined or DD shafts.

### CAUTION: Bolts for Connection

**NEVER USE BOLTS!** Always use roll pins. Roll pins are driven in and fit very tightly in the drilled hole. Bolts often fit loosely inside the drilled hole and repeated back and forth movement, even though very slight, can cause the bolt to work harden and fail.

### CAUTION: Corvair Steering Boxes

Corvairs were rear-engined cars; this means there was very little weight on the front tires. The steering box used in these cars was a very light duty box. **It is not recommended for use in a street rod with the engine in the front. Steering gear failure could cause a severe accident.**

### CAUTION: Vega Steering Boxes

We recommend a maximum weight limit of 2400 lbs for a vehicle using a Saginaw 140 (Vega) steering Box. We recommend the 525 Saginaw box for vehicles exceeding 2400 lbs.

### Diagnosing Power Steering Problems

When trying to determine what is causing a problem in your power steering, keep this in mind: If the problem occurs only in one direction, the problem is probably in the box or rack. If the problem is in both directions, it is most likely the pump, dirty fluid or hoses. Be sure there are no kinks or obstructions in your power steering hoses and that they are the right inside diameter for the application.

### Dirty Steering System

Before changing any single component of the steering system, inspect the cleanliness of your system. Dirty or black fluid can quickly ruin new steering components. If changing the box or rack, rub your finger on the inside of the reservoir. If it isn't clean, you must flush the pump and hoses with clean fluid before installing new components.

### Bleeding Power Steering

All power steering systems are designed to be self-bleeding, but sometimes they need a little help. After installing new components, fill the reservoir and let it sit for a few minutes. Raise the front end of the vehicle and turn the wheels back and forth slowly with the engine off to allow the steering box to draw fluid. Keep the reservoir full. When the fluid level stops dropping, start the vehicle and continue turning the wheels. When the fluid level remains constant the system is fully bled. Put cardboard under the front tires while testing your steering system. The cardboard will slide on the floor and prevent wearing flat spots on the tires from excessive turning of the wheels while not moving.

### Steering Box Adjustment

All Borgeson steering boxes are set at the factory to the proper specifications. Any adjustments of the box beyond that will void the warranty and cause premature wear on the steering box. Please do not try to adjust your steering box. Please contact us if you feel your steering box needs adjustment.

### Power Steering Pressure

GM power steering pumps will produce up to 1,500 PSI. We recommend 1,200 PSI for steering box applications and 800–900 PSI for Mustang rack & pinions. If a pump is generating too much pressure for the rack or box you are using, the steering will be over assisted resulting in twitchy steering at speed. This can be corrected by adjusting the pumps internal pressure valve. To properly adjust this pressure order part #899001 Pressure Reducing Kit.



# STEERING TROUBLESHOOTING

Many factors influence power steering troubleshooting. Here is a list of common steering and driving complaints, their causes, and some suggestions to fix it.

## Road Wander:

Vehicle wanders left/right without any definite input from the steering wheel requiring constant small correction to drive straight.

- Low or unequal tire pressure
- Steering linkage from column to box or rack loose or worn
- Front-end alignment out of specification (Inadequate positive Caster)
- Steering box or rack worn or out of adjustment
- Steering tie rod ends worn or loose

## No Recovery or Return to Center:

Vehicle fails to return to center after a turn or requires steering input to return to center.

- Binding of steering linkage or components
- Front-end alignment out of specification (Inadequate positive Caster)
- Steering box or rack improperly adjusted

## Over-steering / Darting:

Vehicle over steers and is overly sensitive to all steering wheel input requiring constant correction.

- Excessive P/S pump pressure / mismatched components
- Steering linkage from column to box or rack loose or worn
- Steering box or rack worn or out of adjustment

## Lost motion at steering wheel:

Excessive free play felt in the steering wheel before the wheels actually begin to turn.

- Steering linkage from column to box or rack loose or worn
- Steering box or rack worn or out of adjustment
- Steering tie rod ends worn or loose
- Steering gear loose on frame

## High Steering Effort in both directions:

An abnormal amount of force is required to turn the wheels in both directions.

- Low tire pressure
- Low P/S fluid level
- Insufficient P/S pump pressure and flow
- Excessive P/S fluid temperature
- Binding of steering linkage or components

## Intermittent / Loss of power steering:

After servicing the P/S system you experience either a loss of power steering or intermittent assist.

- Low P/S fluid level
- P/S Belt broken or slipping
- Air trapped in the P/S system
- Dirt or contaminants trapped in the P/S pump bypass valve



OFFICIAL STEERING  
COMPONENTS OF THE  
NATIONAL STREET  
ROD ASSOCIATION



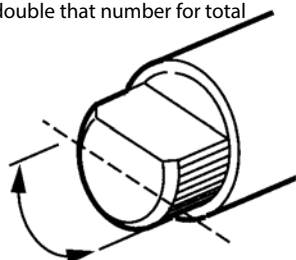
BOBBERSON Steering You Forward



# STEERING BOX AND SPLINE IDENTIFICATION GUIDE



For Splined Shafts with a Flat  
Count the number of splines  
of half the circumference and  
double that number for total



## Popular Splines And Double D Applications

All Measurements can be +/- .015". Precision measuring equipment should be used.

Column Application	Description	Size	Diameter	Splines	Double D Flats
GM Column	Small Spline	3/4"-36	.735	36	
	Large Spline	1"-48	.985	48	
	Small Double D	3/4" DD	.750		.550
	Large Double D	1" DD	.993		.790
Ford Column	Small Spline	3/4"-36	.735	36	
	Small Double D	3/4" DD	.750		.550
	Large Double D	1" DD	.993		.790
Other Manufacturers	International	1"-48	.985	48	
	Ididit-aluminum	1"-48	.985	48	
	Ididit-steel	1" DD	.993		.790
	Flaming River	1" DD (standard)	.993		.790
Boxes & Racks Application	Description	Size	Diameter	Splines	Double D Flats
Chrysler Box or Rack	Chrysler	9/16"-17	.562	17	
	Chrysler	9/16"-26	.562	26	
	Chrysler	9/16"-36	.562	36	
	Chrysler	5/8"-36 C*	.625	36	
	Chrysler	11/16"-36	.687	36	
	Chrysler	3/4"-36	.735	36	
	Chrysler	13/16"-36	.812	36	
	Chrysler Omni	9/16"-26	.562	26	
GM Manual Box	Corvaire	5/8"-36	.625	36	
	Vega (model 140)	5/8"-36	.625	36	
	Corvette ('63-67)	3/4"-36	.728	36	
	Corvette ('68-83)	3/4"-30	.735	30	
	('58-64)	3/4"-36	.735	36	
	Model 122 ('65-85)	3/4"-30 or 3/4"-36	.730	30 or 36	
	Model 525 ('86 & later)	3/4"-30	.728	30	
GM Power Box	Model 605 ('78-84)	3/4"-30	.728	30	
	Model 700 ('77 & earlier)	13/16"-36	.812	36	
	Model 700 ('78 & later)	3/4"-30	.728	30	
GM Rack	'79 & later	5/8"-36	.625	36	
	Some Models	3/4"-30	.728	30	
	Corvette ('84 & later)	17mm DD	.670		.570
	Fiero	17mm DD	.670		.570
Ford Box	Manual & Power	3/4"-36	.735	36	
Ford Rack	Mustang & Pinto Manual	9/16"-26	.562	26	
	Mustang & Pinto Power	3/4"-36	.735	36	
	94-Later Mustang	3/4"-V	.740		
Other Manufacturers	Borgeson 55-57 Chevy Conversion	18mm DD	.708		.635
	Borgeson 58-64 Chevy Conversion	17mm DD	.670		.570
	Borgeson Chevy II Nova Conversion	11/16"-36	.687	36	
	Borgeson Corvette Conversion Box	18mm DD	.708		.635
	Borgeson Ford Conversion Boxes	11/16"-36	.687	36	
	Borgeson Mopar Conversion Boxes	11/16"-36	.687	36	
	Borgeson 800130 GM Upgrade	3/4"-30	.725	30	
	Woodward Rack	3/4"-20	.735	20	
	Nissan	11/16"-36	.687	36	
	Jaguar & MGB	3/4"-48	.750	48	
	Unisteer Manual Rack	9/16"-26	.562	26	
	Volkswagen Rabbit Rack	11/16"-40	.687	40	
	VW Rabbit Rack Diesel	3/4"-36	.735	36	

\*The 5/8"-36 Chrysler is not interchangeable with 5/8"-36.

# SHOP TOUR

## Wide Angle View



## CNC Production



## Saginaw Manual Steering Gear Production



## Power Steering Assembly & Testing



## Packaging, Shipping & Inventory





## GENERAL INFORMATION

### Shipping Information

It is our policy to charge only the actual shipping charges. We ship via UPS or Fed Ex with either Ground, 3 Day, 2nd Day or Next Day Air.

### Warranty

Borgeson will not be liable for personal or property damage caused by the use or misuse of any product that we manufacture or sell. We have no control over installation and/or use of our products. We will repair or replace, at our option, any product found to be defective in either material or workmanship subject to our inspection. Normal wear is excluded from this warranty. Any product that has been abused, altered, or incorrectly installed is not covered. Our sole remedy shall be repair or replacement, no monetary refund will be granted. Any parts used in competition are excluded from this warranty.

### Return Policy


It is our policy to accept any inventory product purchased directly from us and currently offered for sale for exchange or, at our option, a refund. All items are subject to a 10% restocking fee. Products must be in resalable condition with no paint or alterations. If rework is necessary, the cost of the rework will be deducted from the credit allowed. If a product was purchased from a Borgeson dealer, the return must be handled through that dealer. Before any item can be returned to us, a Return Authorization Number must be obtained from us. COLLECT CALLS OR C.O.D. SHIPMENTS ARE NOT ACCEPTED. The Return Authorization Number must be clearly marked on the outside of the box and paperwork with replacement instructions must be included.

### Claims For Damage In Shipping

Claims for damaged or lost merchandise are to be made to the freight carrier. If you receive a damaged package or a package that looks like it has been tampered with, make a written note on this to the freight carrier when you sign for the package. Carefully open and be sure to save the damaged container as visible proof. This is the first thing they will ask to see. Notify the local office of the freight carrier as soon as possible (within 48 hours).

### CA Proposition 65 Warning Information

Borgeson applies warning labels either on our product(s), or the packaging containing our product(s) regarding CA Prop 65. This warning is part of our effort to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986 (known as "Proposition 65"). The warning does not mean that our products will necessarily cause cancer, birth defects, or other reproductive harm. While we believe our products are not harmful when used as designed, and we rely on our suppliers to help with this effort, we also provide these warnings to comply with Proposition 65.

**WARNING**

This product can expose you to chemicals including Nickel and Chromium (hexavalent compounds), which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information visit: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



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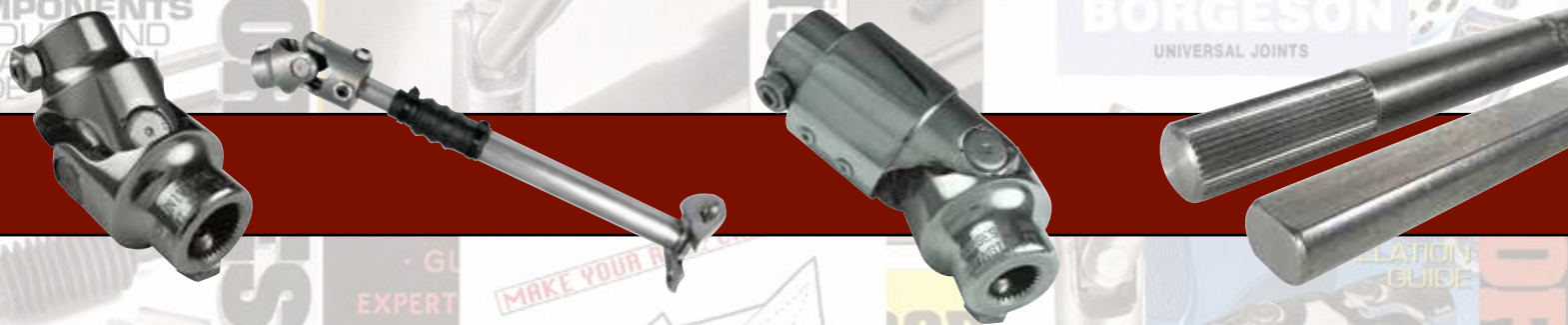
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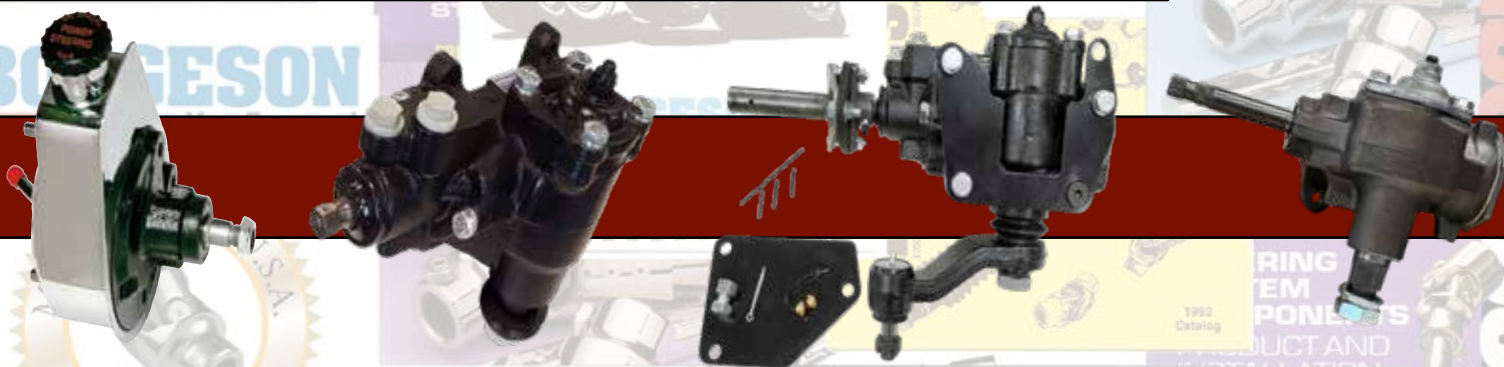
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SINCE 1914

THANK YOU. *The success and vitality of Borgeson Universal Company is due to the loyal support of our customers. Here at Borgeson Universal we are thankful for your support throughout these many years, and look forward to a continued relationship with you.*

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