



63-82 Corvette Rack and Pinion Conversion Kit



For safety, disconnect battery cables and ensure that vehicle is properly supported by jack stands.

NOTE: For kits FR312PW & FR312PW-1, hoses are included to connect Flaming River power rack to factory power steering pump. For kit FR312PW1, you must also purchase a Flaming River power steering pump kit:

- FR312PK (small block)**
- FR312PK2 (big block)**

Before paint or powder coating of the rack and pinion cradle system we recommend that you prefit the system to ensure proper fit.

NOTE: A front end alignment is necessary after installation.

NOTE: Flaming River Recommends that you use synthetic or high grade power steering fluid.

Kit Inventory pg 3-4

Original System Removal pg 5-6

Rack and Cradle Installation

 Power pg 7

 Manual pg 8

Universal Joint Prep (Manual) pg 8

Universal Joint Installation pg 9

Power Steering Pump Installation.....pg 10

Power Steering Pump Kit Inventorypg 11

Power Steering Bleeding Procedure.....pg 12

Engine Support Bracket Cutting Template.....pg 13

WARRANTY DISCLAIMER: Flaming River’s® Limited Warranty

Flaming River® warrants its products to be free from defects in material and workmanship for a period of one (1) year after the date of purchase, except that: All steering columns are warranted for a period of three (3) years from the date of purchase. The Big Switch (part number FR1005) is warranted for a period of three (3) years from the date of purchase, provided that it is not mounted with a steel bracket and provided further that it is adequately protected from environmental conditions. All electrical products other than the Big Switch are warranted for a period of ninety (90) days from the date of purchase. Flaming River’s® warranty liability is limited to the replacement of defective products. Flaming River® is not liable for any labor costs associated with any warranty claim, or for any incidental or consequential damages. Improper installation, abuse, racing, and/or modification of the products voids this warranty. No warranty of merchantability or fitness for a particular purpose is made by Flaming River® with respect to any of its products. Warnings and Recommendations It is the customer’s responsibility to determine the suitability of a given Flaming River® product for the customer’s uses. Likewise, it is the customer’s responsibility to install a Flaming River® product. Contact the vehicle manufacturer whenever installing a switch to confirm the appropriateness of using such a switch and the recommended placement of the switch on the vehicle. Use qualified chassis specialists for the installation of all steering related components. Be aware that the installation of certain Flaming River® products may adversely impact a manufacturer’s warranty with respect to certain vehicles and other manufactured goods. Flaming River will repair or replace any product found to be defective in material or workmanship. Improper installation, abuse, racing and/or modification VOID WARRANTY. Flaming River® is not responsible for any labor costs associated with any warranty.

Item No.	Part No.	Description	Qty
1	FR1969	FR Power X 3/4" DD Universal Joint	1
2	FR1796	3/4" DD X 1"-48 Double Universal Joint (FR312PW & FR312PW1)	1
3	FR1790	3/4"-36 X 3/4" DD Double Universal Joint (FR312PW-1)	1
4	FR1851-10SS	10" Length of 3/4" DD Shaft	1
5	FR1810 KA	Support Bearing and Bracket	1
6	100781	Installation Hardware Kit	1
7	100776	Power Rack and Mounting Cradle Assembly	1
	100878	Hose Kit (FR312PW & FR312PW-1 only)	1

1963-66 (For use with original pump) FR312PW-1

1967-82 (For use with original pump) FR312PW

1963-82 (For use with Flaming River pump) FR312PW1

P/N 100878 Hose Kit Includes:

(1) M16 X 1.5-AN6 Straight Fitting Part # FRM16X6AN

(1) M14 X 1.5-AN6 Straight Fitting Part # FRM14X6AN

(1) .37" X .87", 1/2" Band Clamp Part # FR620-006

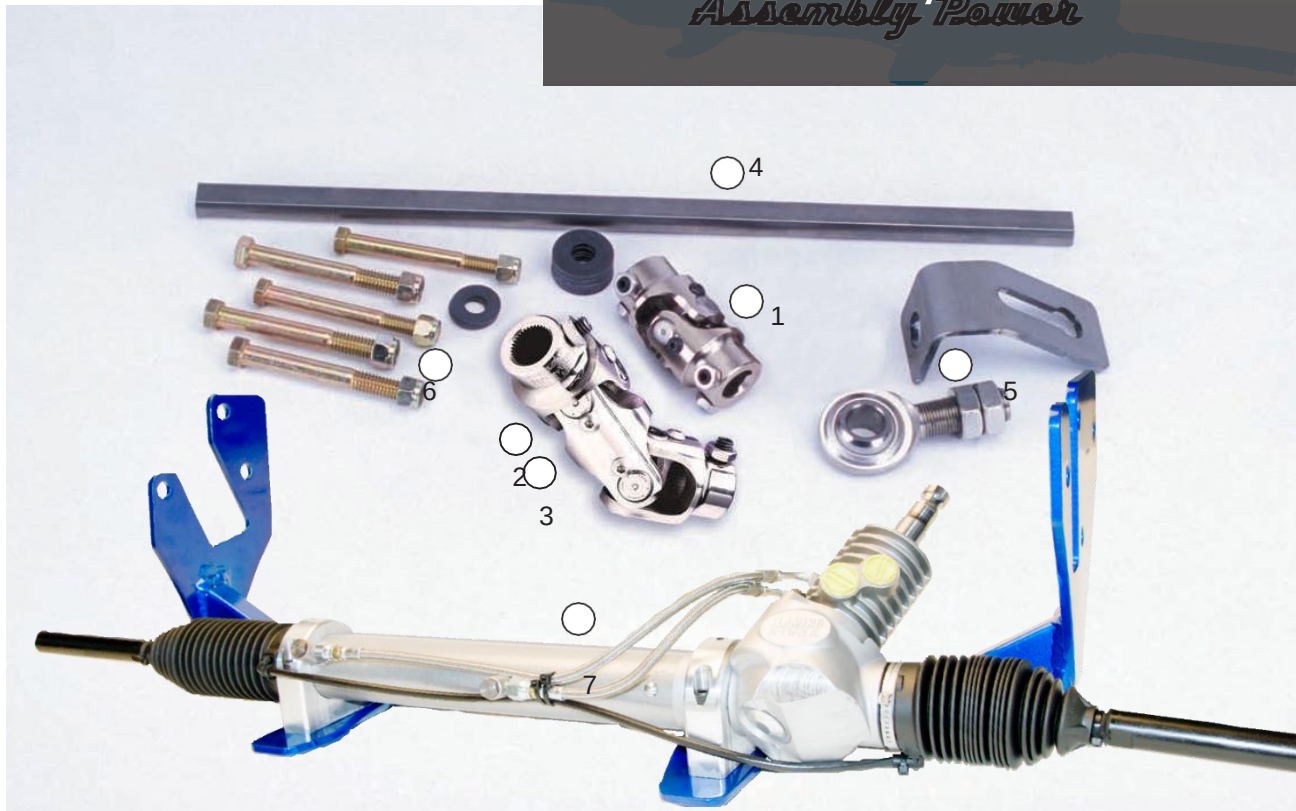
(3) .07XØ.301 ID (Dash 011) O-Rings Part # 101357

(1) Pressure Hose -6X21.00 Part # 100877

(1) Return Hose -6 X 19.68 Part # 100876

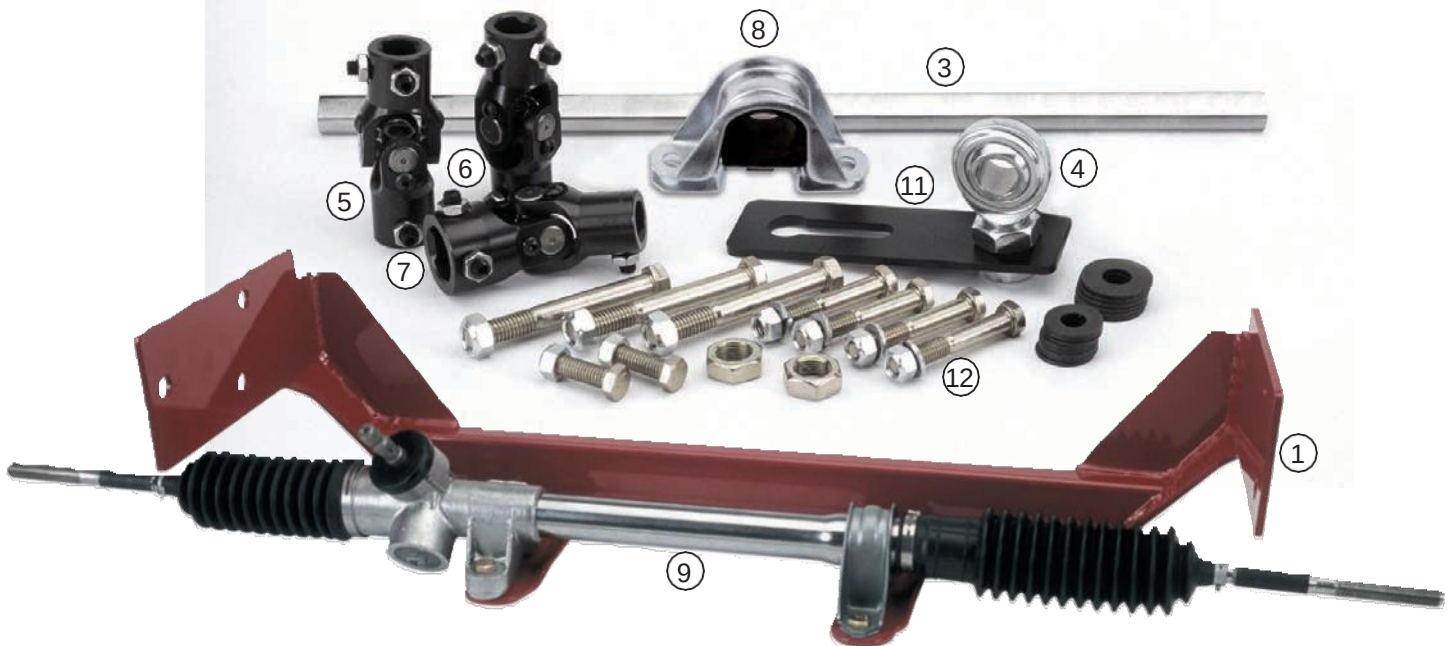
(1) AN6 X 5/8"-18 X 1.28" Fitting Part # 100780

1963-82 Corvette Cradle and Shaft Assembly Power



Item No.	Part No.	Description	Qty
1	FRVTM1	Rack Mounting Cradle	1
2	FRDMDCL	FR Domed Decal	1
3	FR1850	18" Length of 3/4" DD Shaft	1
4	FR1810-2	Zinc 3/4" Support Bearing	1
5	FR1716DD	3/4" DD X 3/4" DD Universal Joint	1
6	FR1712DD	1"-48 X 3/4" DD Universal Joint	1
7	FR1709DD	9/16"-26 X 3/4" DD Universal Joint	1
8	FR1507C	Rack Mounting Clamp w/ Bushing	1
9	FR1507-3Q-8	Manual Rack and Pinion	1
10	FR1.75-SAW	1-3/4" Hole Saw	1
11	BK10300	Support Bearing Bracket	1
12	100236	Installation Hardware Kit	1

1963-82 Corvette Cradle and Shaft Assembly Manual

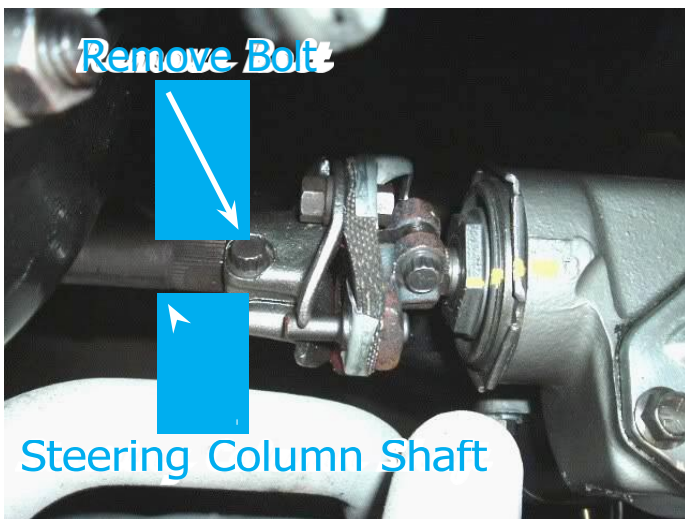


Removing Original Steering System

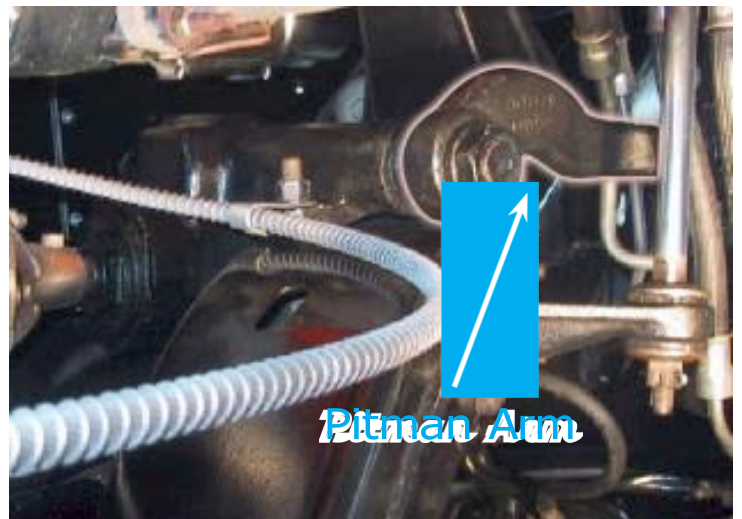
For safety, disconnect your battery



Before beginning you must first measure the width of your front end from LEFT outer tie rod end zerk to the RIGHT outer tie rod end zerk to determine the overall width of your front end. Write dimension here for further reference _____

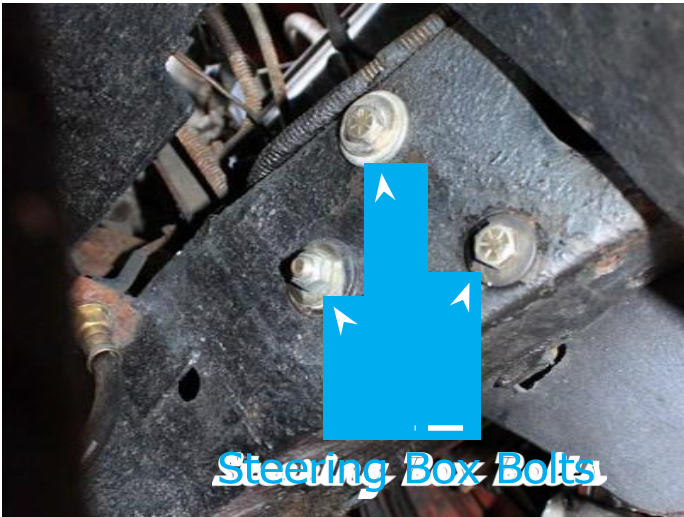


1) Remove the bolt that retains the rag joint coupler to the factory steering column shaft and spread flange.

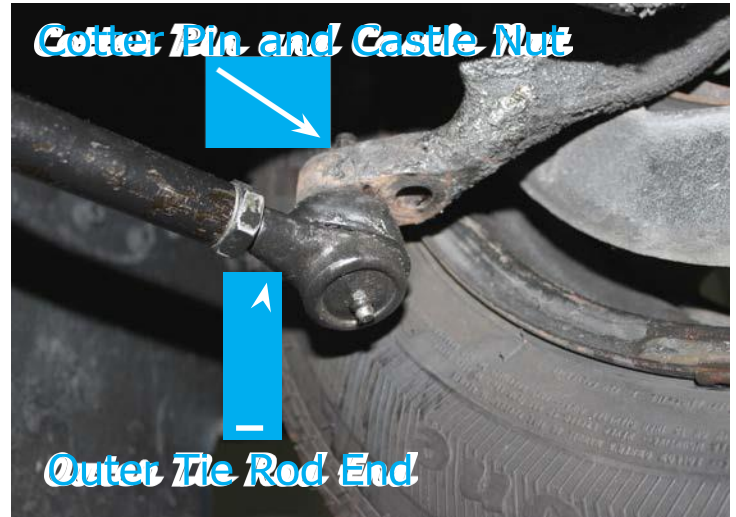


2) Remove the pitman arm from the steering box using a pitman arm puller.

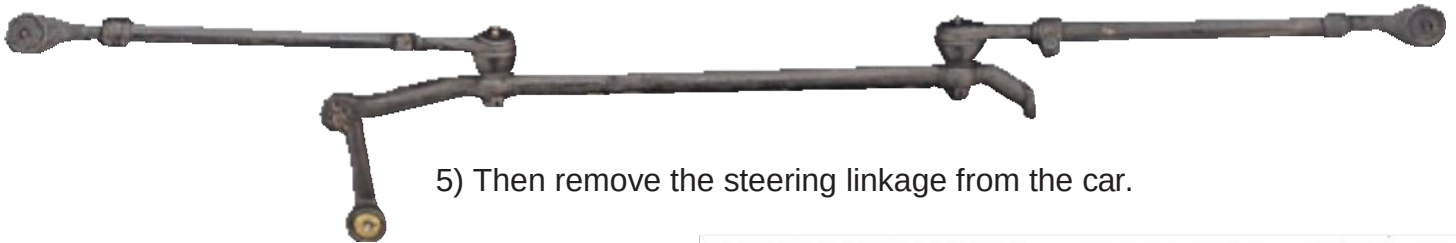
Original System Removal



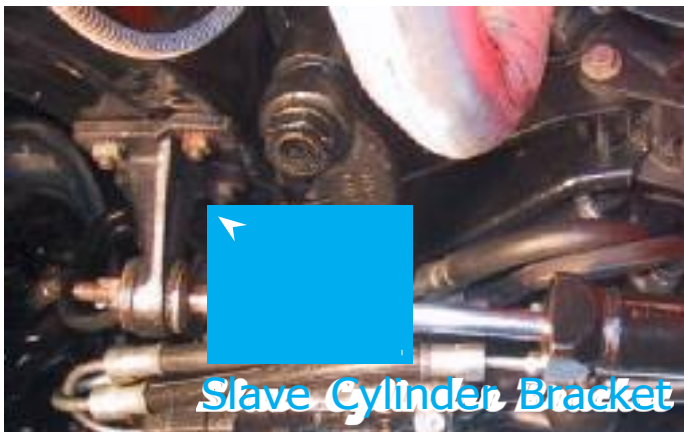
3) Remove the bolts that hold the steering box to the frame, and then remove the box from the car.



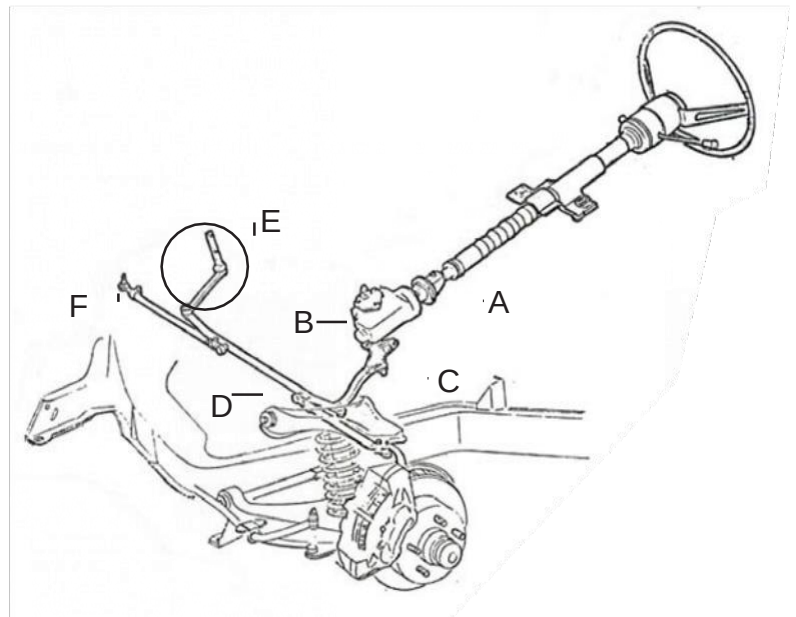
4) Next remove the bolts that hold the idler arm bracket to the frame and remove the cotter pins and castle nuts and separate the outer tie rod ends from the spindles.



5) Then remove the steering linkage from the car.



If your vehicle has power steering, remove the power steering lines from the pump to the power steering control valve and drain your system. Then, remove the four bolts that retain the power steering slave cylinder bracket to the frame rail. (If installing manual cradle, also remove power steering pump)



A) Rag Joint
B) Steering Box
C) Pitman Arm

D) Steering Linkage
E) Idler Arm Assembly
F) Outer Tie Rod End

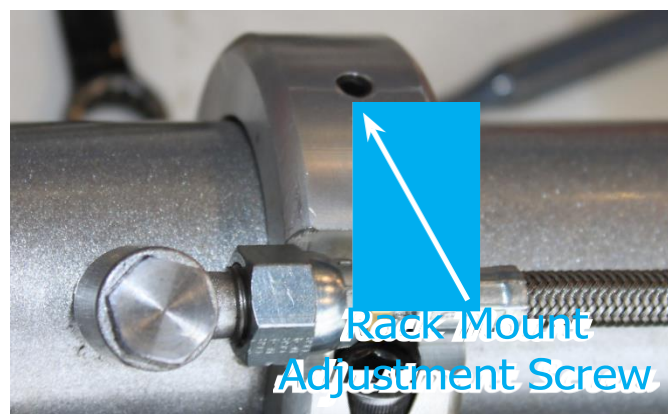
Note: If you are going to use the factory power steering pump with the new Flaming River Power Rack and Pinion you must flush any old power steering fluid from the system.
Failure to do so can result in damage to the rack.

Flaming River Rack and Pinion Cradle Installation (Power)



1) Install the rack and pinion cradle by sliding it into place between the frame rails. Using the new hardware, install the three (3) 3/8" bolts on the drivers side using the original holes from the steering gear box and the additional hole that is located under the factory motor mount. On the passenger side use idler arm bolts and the additional hole that is located under the factory motor mount (3) 3/8" bolts and tighten all the bolts and nuts to 40-45 ft. lbs.

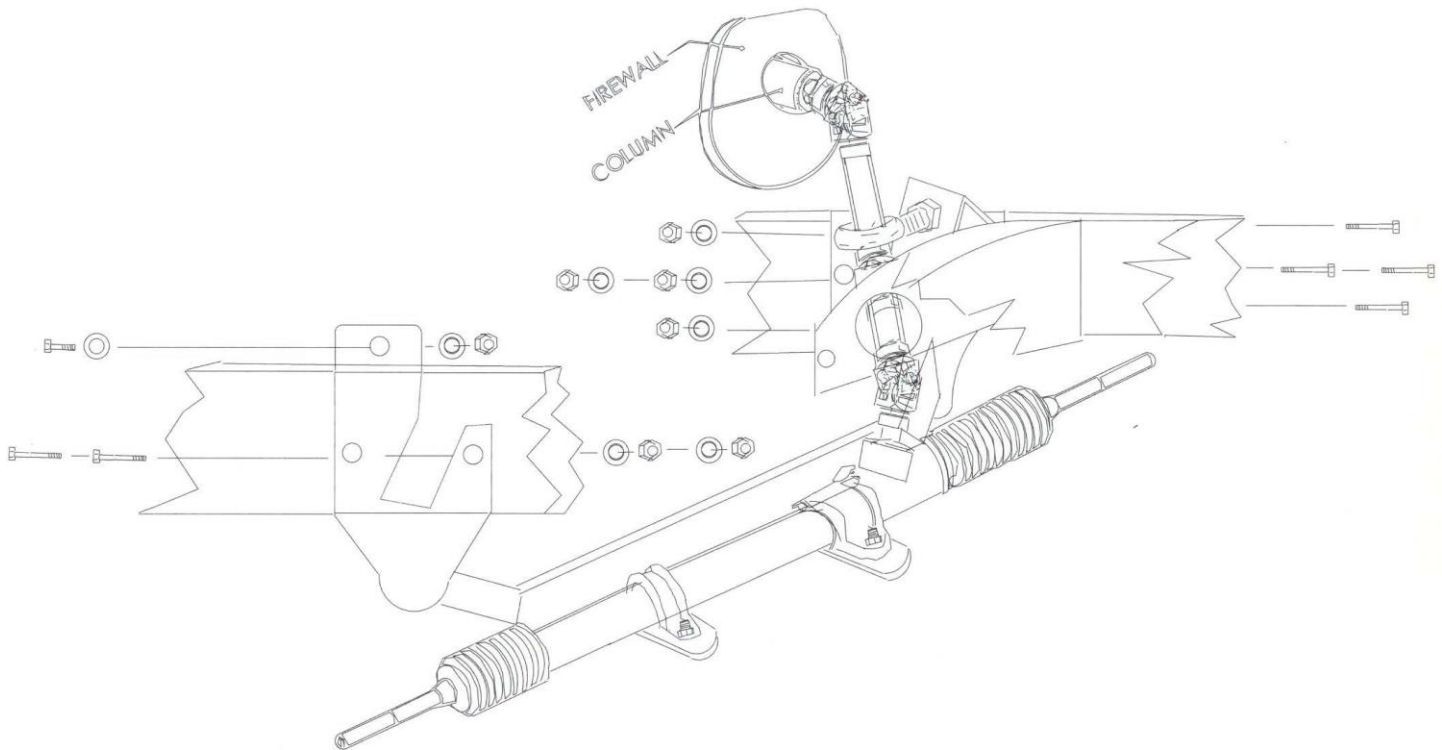
2) The locking set screw in the center of the rack mounts can be loosened to adjust the pinion angle which will aid in u-joint alignment.



3) Install the OEM outer tie rod end into the Flaming River inner tie rod end on the new power rack. Note: If using the original parts some adjustment of the tie rod assembly may be required when connecting the to the spindle arm and the travel bar.

4) To install the outer tie rod end into the spindles you must load the front suspension. Securely place jack stands under the lower control arms and lowering the car onto the jack stands. Make sure that your wheels are centered, then install the outer tie rod into the rear hole on the spindle arms and tighten the castle nuts to 30-40ft lbs. Make sure to install the cotter pins through the castle nut and tie rod end and bend the tabs over.

Flaming River Rack and Pinion Cradle Installation (Manual)



- 1) Begin by centering the rack. Turn the rack all the way to the left. Next, turn it all the way to the right-counting the number of turns. Then go back to the left half the number of turns.
- 2) Install the passenger side rack mounting clamp onto rack tube.
- 3) Place rack onto cradle mounting feet.
- 4) Using the 1 1/2"x 3/8 bolts on the driver's side and 1"x 3/8 bolts on the passenger side, mount the rack to the cradle.
- 5) Install the rack and pinion mounting cradle by placing it in between the frame rails and lining up the mounting holes. On the driver's side, use the original steering box mounting holes and on the passenger side, the idler arm mounting holes.
- 6) Slide the new carriage bolts through the holes and tighten to 45-50 ft lbs.
- 7) Install the outer tie rod ends and jam nuts onto the outer tie rod end assembly and install them into the inner tie rod ends. Adjust the outer ends to the dimension that you checked on the index page.
- 8) Install the outer tie rod ends into the spindle arms.

Universal Joint Prep (Manual Only)

- 1) Remove the template on the last page.
- 2) Cut out template along the solid line and cut out hole for the motor mount bolt.
- 3) Place cut out template on the engine support bracket aligning the motor mount bolt hole on the motor mount bolt. Template should be facing the firewall.
- 4) Center punch the "X" in the large hole on the template and then cut out the hole using the hole saw in the kit.

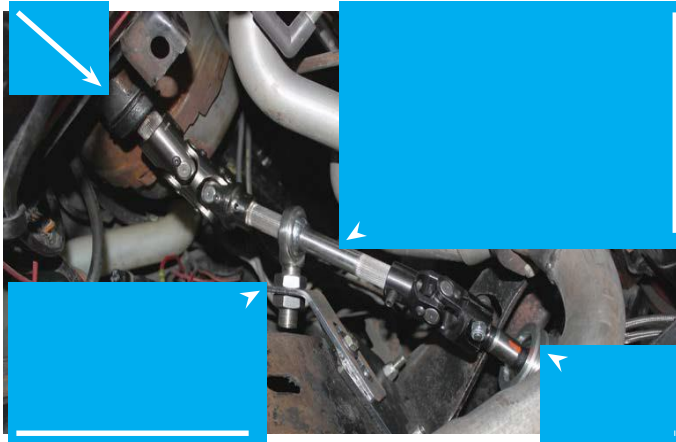
Universal Joint and Shaft Installation



Note: Depending on u-joint alignment, It may be necessary to shorten the factory steering column by either trimming the the steering column shaft (63-66) or collapsing the column shaft (67-82) until the splines meet the end of the column tube. (example shown in picture to left).

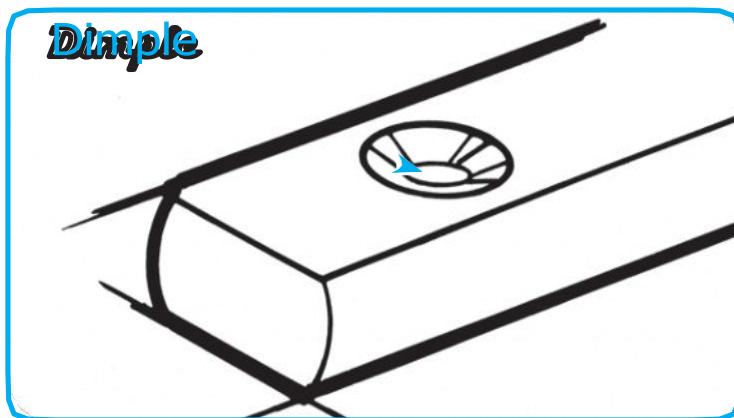
Steering Column

Steering Shaft



- 1) Using a 3/4" wooden dowel rod, mock up the steering shaft to obtain the correct shaft lengths and u-joint angle.
- 2) Once the correct shaft lengths are obtained, install shafts and u-joints snugging down each set screw so that it leaves a mark in the shaft.
- 3) Remove the shafts and using a 1/4" drill bit, dimple each mark left by the set screws. (See Below)
- 4) Re-install the shafts and u-joints using a red thread locker on the set screw threads. Tighten each set screw to 25 ft lbs. and then tighten all jam nuts securely.

**** We recommend that you regularly inspect the u-joint set screws for tightness.****



Torque Specs:

Cradle to Frame Mounting Bolts: 45-50 ft lbs • Outer Tie Rod Ends to Spindle: 30-40 ft lbs

Universal Joint Set Screws: 25 ft lbs

Small Block (FR312PK) and Big Block (FR312PK2) Power Steering Pump Kits

(Sold separate - for use with FR312PW1)

Item No.	Part No.	Description	Qty
1	WASH-3/8"	3/8" Flat Washer Grade 8 EQU	3
2	NUT-3/8-16	3/8"-16 Nylock Lock Nut	1
3	LOCKWASH-3/8"	3/8" Lock Split Washer	5
4	FRPMPSB-V	Pump w/ V-Belt Pulley On	1
5	FR1614	Power Steering Reservoir	1
6	FR1610	Remote Reservoir Hose Kit	1
7	BOLT-3/8-16X2.5	3/8"-16 Grade 8 Bolt 2.5" Long	1
8	100894	3/8"-16 X 3.63" Stud Mtg Pump Water	1
9	100893	Reservoir Mounting Bracket	1
10	100889	.62" X 3.50" w/3/8"-24 Spacer	1
11	100888	.40" X .75" X 1.057" Spacer	2
12	100887	.38" X .643" X .50" Spacer	1
13	100886	.40" X .75" X .775" Spacer	1
14	100885	.40" X .90" X 1.28" Spacer	2
15	100884	.35" X .75" X .28" Spacer	1
16	100883	3/8"-16 X 2.75" Hex Hd Gr 8 Screw	1
17	100882	3/8"-16 X 2.25" Hex Hd Gr 8 Screw	3
18	100881	5/16"-18 X 1.00" Hex Hd Gr 8 Screw	1
19	100730	.32" X .57" X .06" Flat Washer	2
20	100729	3/8"-24 Jam Nut RH	1
21	100728	3/8"-24 Jam Nut LH	1
22	100725	.32" X .47" X .04" Flat Washer	2
23	100724	M8 X 1.25" X 20 Hex Hd Gr 8.8 Bolt	2
24	100668	Heim Joint, End Rod 3/8-24 LH	1
25	100667	Heim Joint, End Rod 3/8-24 RH	1
26	100649	L Shaped Pump Bracket (Big Block Kit FR312PK2)	1
27	100634	Screw, 5/16"-18 X .75" SHCS LB	2
28	100633	U-Shaped Slot Pump Bracket	1
29	100632	L Shaped Pump Bracket (Small Block Kit FR312PK)	1
30	100524	5/16" Lock Washer	1



Instruction Bulletin #1021 Correct Bleeding Procedure for Flaming River Power Rack & Pinion Systems.



Pressure
14MM x 1.5

Return
16MM x 1.5

Make sure that all hoses (FR1610) are connected to the proper location. Reversing the power steering lines will cause damage to the valve that is not covered by the manufacturer's warranty.

All hose connections must be tight. (Loose connections might not leak but could allow air into the system)

Important

***** Power Steering Fluid*****
Use clean, new power steering fluid only.

- 1)  Turn Ignition Off
- 2)  Raise front wheels off the ground.
- 3)  Turn the steering wheel full left.
- 4)  Fill fluid level to "Full Cold" level or if using remote reservoir 1" over inner tube.
- 5)  With assistant checking fluid level and condition, turn steering wheel lock to lock at least 20 times.
- 6)  While turning wheels check fluid level constantly.
- 7)  Start engine. With engine idling, maintain fluid level. Reinstall cap.
- 8)  Return wheels to center. Lower front wheels to the ground.
- 9)  Keep engine running for two (2) minutes.
- 10)  Turn steering wheel in both directions.
- 11) If all proper conditions apply, bleeding is complete.
- 12) If any problem remains see "Special Conditions".

Note: On systems with long return lines or fluid coolers, turn steering wheel lock to lock at least 40 times.

Trapped air may cause fluid to overflow. Thoroughly clean spilled fluid to allow for leak check.

Verify:
Smooth power assist
Noiseless operation
Proper fluid level
No system leaks
Proper fluid condition
No bubbles, no foam,
no discoloration.

Note: No bubbles are allowed.

For any sign of bubbles, recheck connections then repeat step 5.

Special Conditions:



- Foam or bubbles in fluid

Fluid must be completely free of bubbles. In step 5, be alert to periodic bubbles that could indicate a loose connection or leaky O-Ring seal in either the return hose or pressure hose.

- Discolored fluid (milky, opaque, or light tan color)

Switch ignition off. Wait two (2) minutes. Recheck hose connections. Repeat steps 7-10. If condition still exists, replace and check a possible cause:

- Return hose clamps
- Return hose o-ring
- Pressure hose o-ring
- Gear cylinder line o-rings

Fill system and repeat bleed procedure for each possible cause. Repeat steps 7-10 to verify whether noise has been eliminated.



- Pump whine or groan

With engine running, recheck hoses for possible contact with frame body or engine. If no contact is found, follow either method below to cool down fluid and re-pressurize system.

Method 1:
Normal Cool Down

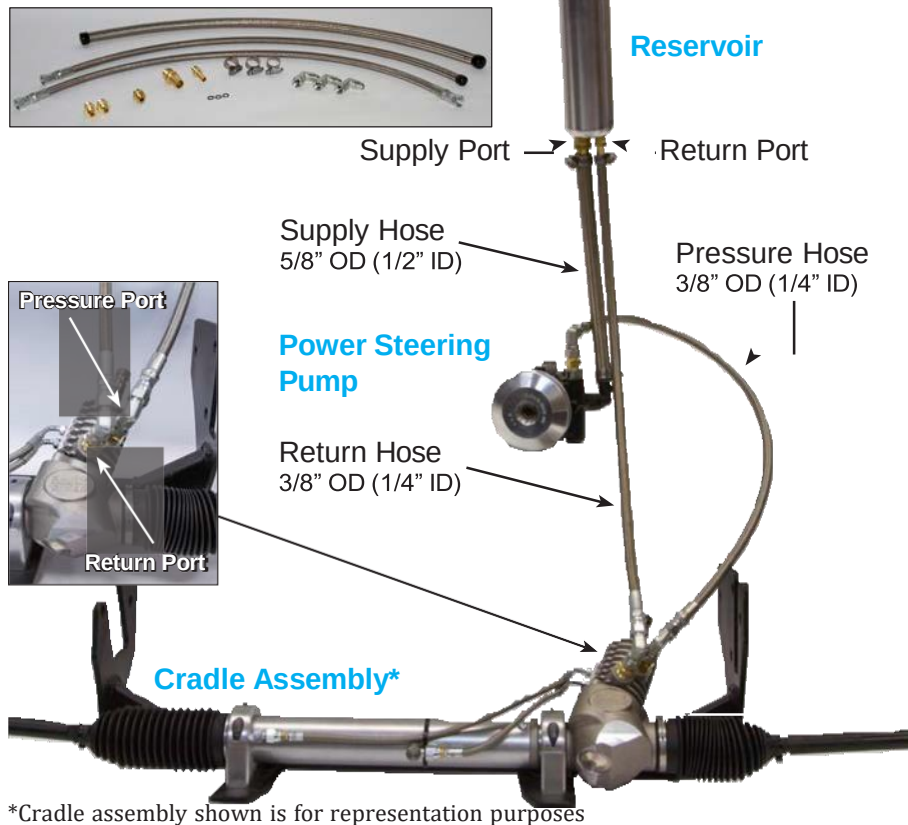
Switch engine off.
Wait for system to cool.
Install reservoir cap.

Method 2:
Partial Fluid Replacement

Switch engine off. Use a Suction device to remove fluid from the reservoir. Refill with cool, clean fluid. Install Reservoir cap.

After either method of cooling, start engine and allow engine to reach normal operating temperature. If noise persists, remove and replace power steering pump. Repeat bleed procedure following pump replacement.

FR1610 Hose Kit Routing



*Cradle assembly shown is for representation purposes



If not using our hose kit, we recommend purchasing the FR1632 Pressure and Return fittings kit. If you have any questions regarding connecting alternate hose kit to Flaming River Cradle Assembly, please call 1-800-648-8022.

Additional Installation Products

HIGH OUTPUT ALTERNATORS



Die Cast w/Chrome Housing

FR1108C 170 Amp

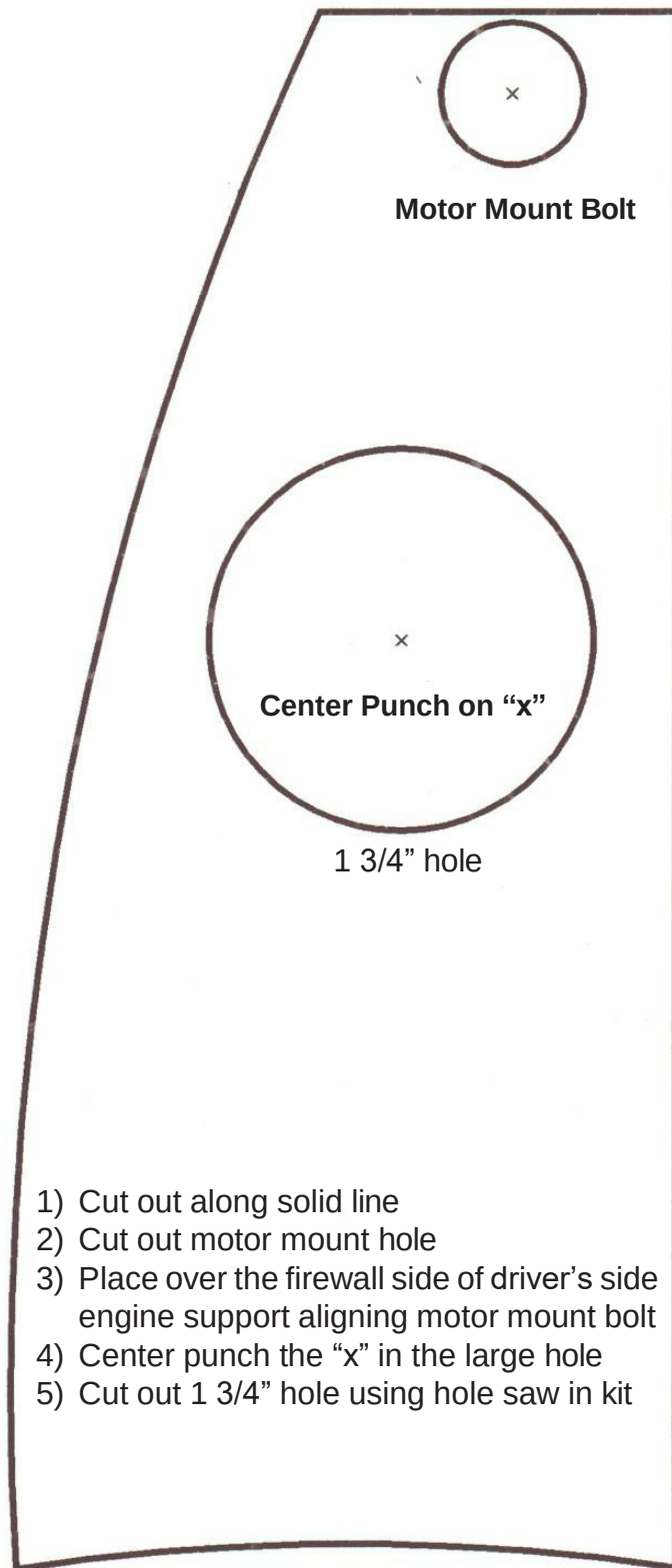
FR1109C 240 Amp

STEERING WHEELS



"Leather Like" Molded Black with
OE "Vette" Bolt Pattern Center
FR20171BK

Template for Cutting Engine Support Bracket (Manual Only)



In order to ensure the best customer experience possible, we've created a Customer Satisfaction Survey to gather important feedback about different facets of our business. We would appreciate it if you could please take a couple of minutes to fill out this survey about your experience.

The results of the survey will be used to improve and gather feedback about customer service, technical and sales support, order processing and fulfillment, manufacturing, and new product development.

Upon completing the survey, you will be issued a discount coupon code to be used on your next online purchase at www.flamingriver.com/survey.

