



Flaming River Ind.
800 Poertner Dr
Berea, OH 44017
800-648-8022

*70-81 Camaro
Rack and Pinion
Conversion Kit*



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

NOTE: Hoses (FR1610) and Pump Mounting Brackets (FR1612–Small Block or FR1613–Big Block) sold separately and not included in this kit.

70-81 Camaro Outer Tie Rod Ends Part # ES404RL (70-74) or ES441RL (75-81) must be used with this rack and pinion kit. (Must purchase separately from local or online auto parts supplier)

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.

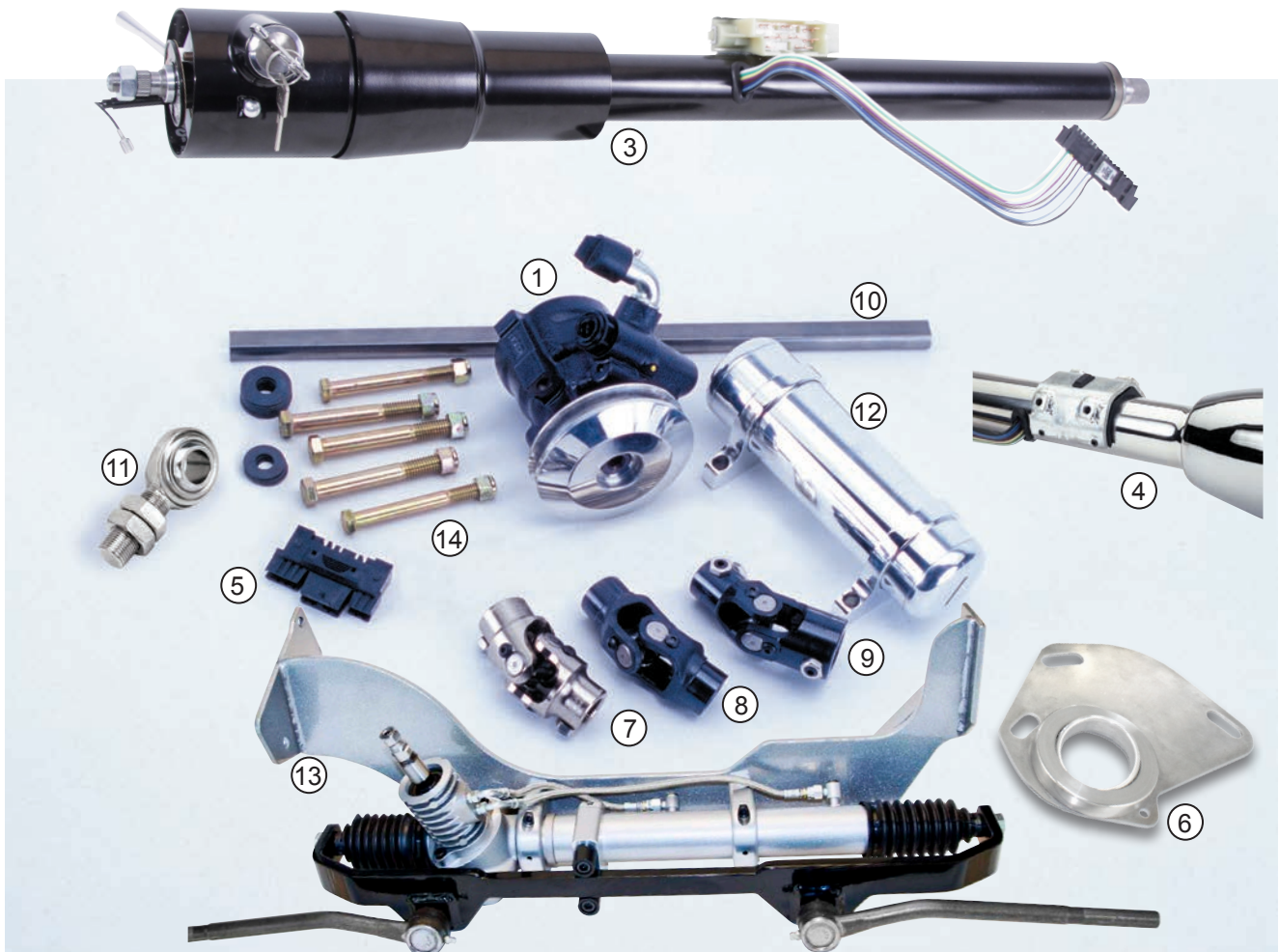
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WARRANTY DISCLAIMER: Flaming River's® Limited Warranty

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.

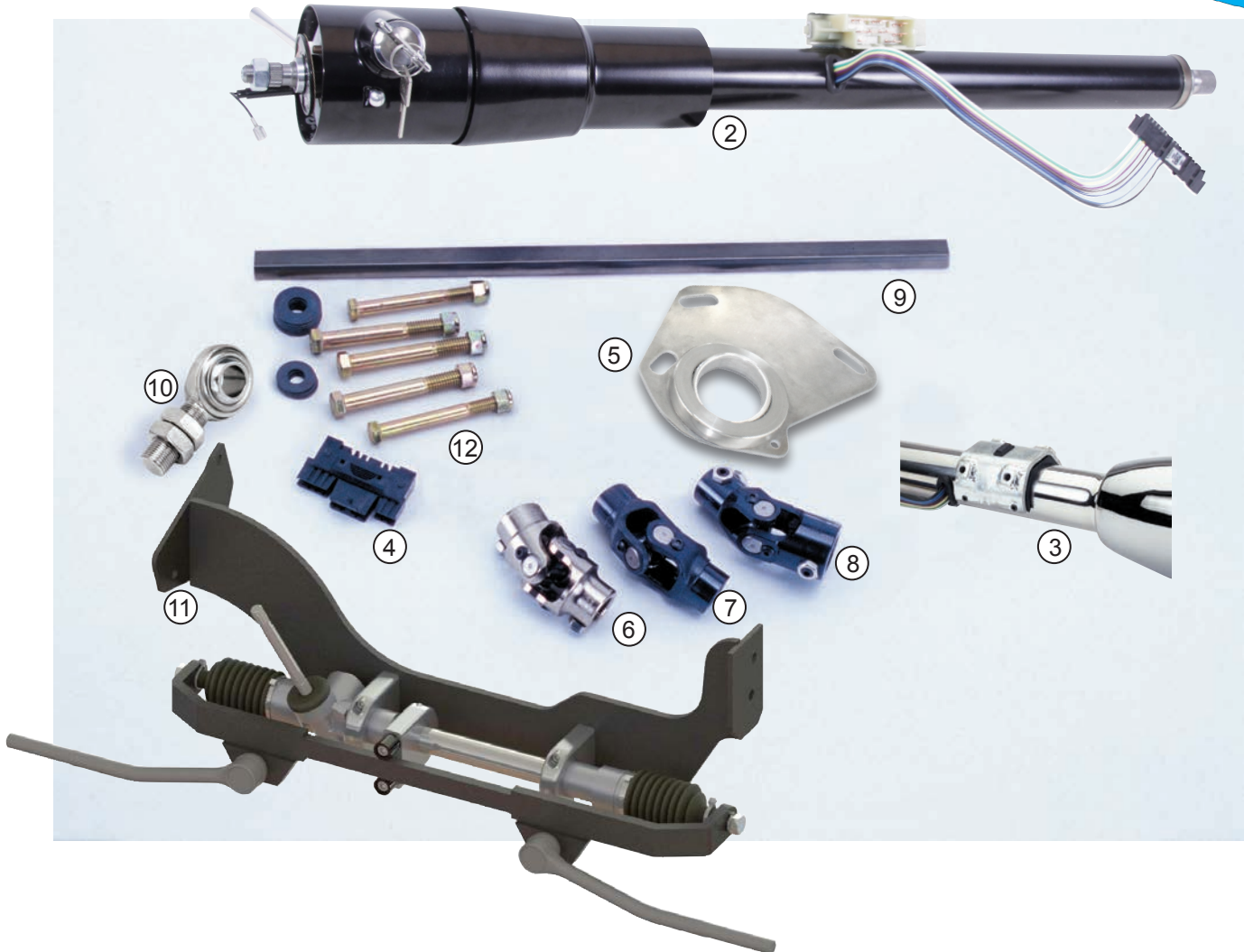
Item No.	Part No.	Description	Qty
1	FRPMP5B-V	Power Steering Pump w/ V-Belt Pully	1
2	FRDMDCL	FR Domed Decal	1
3	FR30010 Series	Tilt Key Steering Column	1
4	FR20300	Stramp Clamp	1
5	FR20118	Female Connector Kit	1
6	FR20101CA	1970-81 Camaro Swivel Floor Mount	1
7	FR1789P	FR Power X 3/4" DD Universal Joint	1
8	FR1717DD	3/4" DD X 1" DD Universal Joint	1
9	FR2644	3/4" DD X 3/4" DD Universal Joint	1
10	FR1850-22	22" Length of 3/4" DD Shaft	1
11	100205	3/4" Support Bearing	1
12	FR1614	Power Steering Fluid Reservoir	1
13	100207	Power Rack and Mounting Cradle Assembly	1
14	100202	Installation Hardware Kit	1

1970-81 Camaro Cradle and Shaft Assembly Power



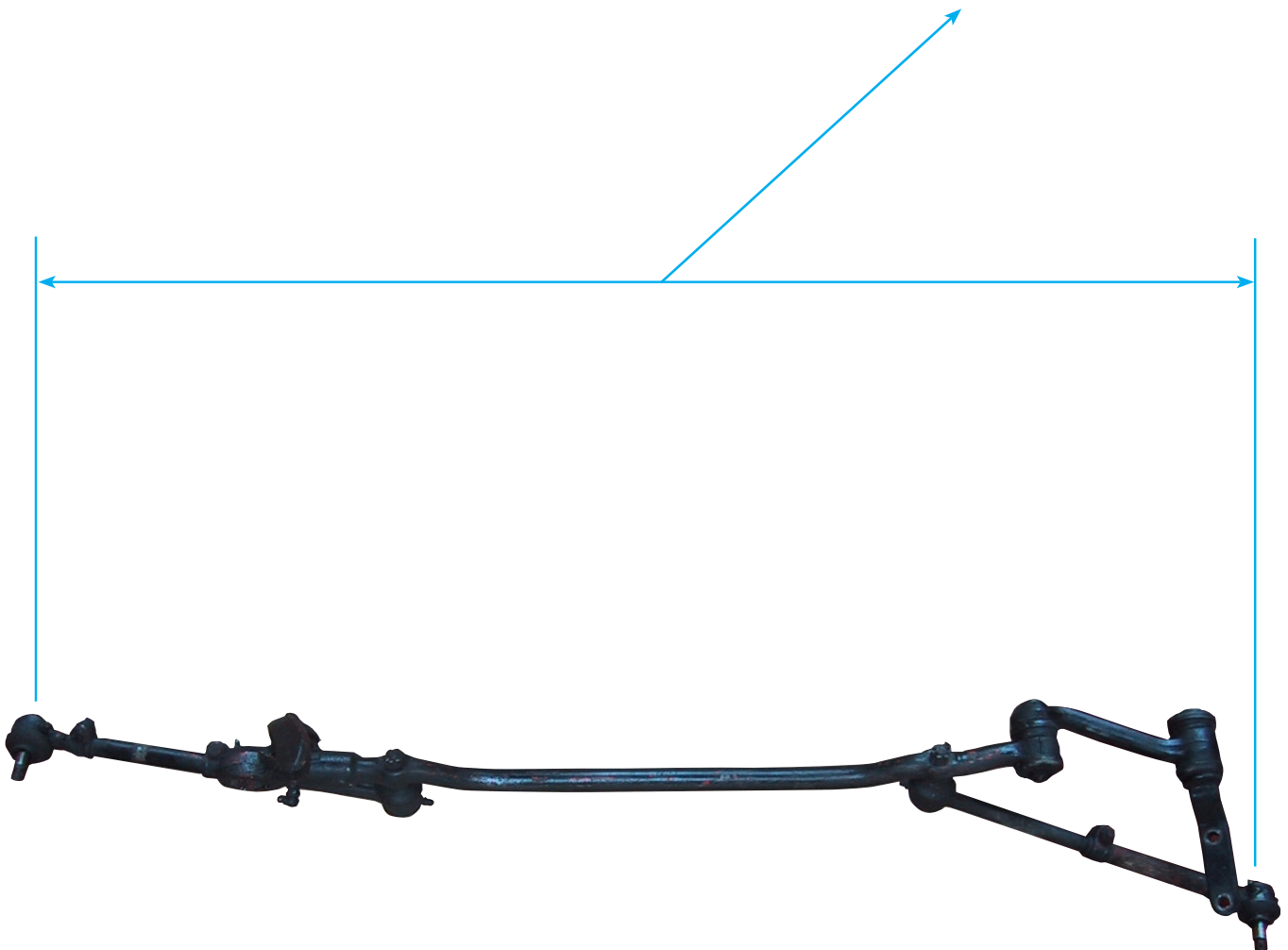
Item No.	Part No.	Description	Qty
1	FRDMDCL	FR Domed Decal	1
2	FR30010 Series	Tilt Key Steering Column	1
3	FR20300	Stramp Clamp	1
4	FR20118	Female Connector Kit	1
5	FR20101CA	1970-81 Camaro Swivel Floor Mount	1
6	FR1709DD	9/16"-26 X 3/4" DD Universal Joint	1
7	FR1717DD	3/4" DD X 1" DD Universal Joint	1
8	FR2644	3/4" DD X 3/4" DD Universal Joint	1
9	FR1850-22	22" Length of 3/4" DD Shaft	1
10	100205	3/4" Support Bearing	1
11	100340	Manual Rack and Mounting Cradle Assembly	1
12	100202	Installation Hardware Kit	1

*1970-81 Camaro
Cradle and Shaft
Assembly Manual*



Removing Original Steering System

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 _____



Original Steering Shaft Removal

Before disconnecting the turn signal and the ignition connectors verify the wiring color to ensure proper operation. The colors listed with the ignition switch diagram below are from a stock wiring system. Wire colors may change due to the use of aftermarket wiring harnesses and wiring modifications. The use of a wiring diagram is recommended.

Color Verification to be completed before disassembly

- Brake Light Switch : _____
- RR Turn Signal : _____
- LR Turn Signal : _____
- Turn Signal Power : _____
- Hazard Power : _____
- RF Turn Signal : _____
- LF Turn Signal : _____
- Horn : _____



Coupler Mounting Bolt

Steering Coupler



Rag Joint



Original Steering Shaft

- 1) Remove the pinch bolt that retains the steering coupler to the steering column and the bolt that retains the rag joint to the steering box. Collapse shaft and remove it from the car.

Original Column Removal

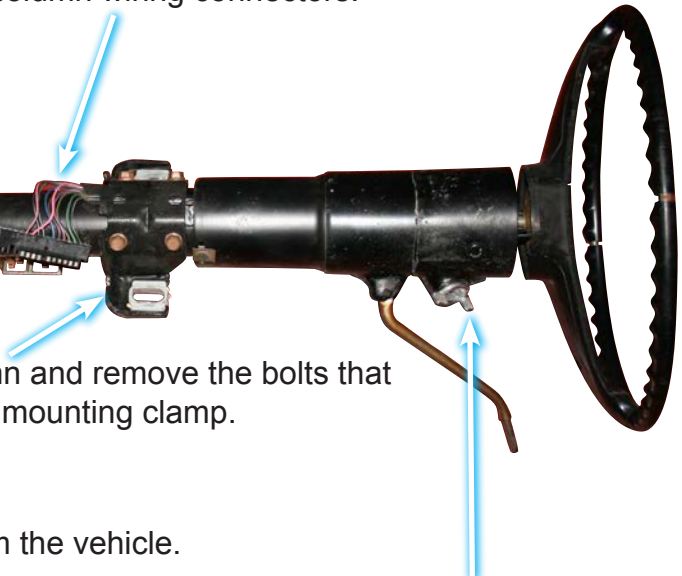
Only perform these steps if using a new Flaming River Steering Column

- 1) Disconnect the column wiring connectors.

- 2) Remove the bolts that hold the column floor mount to the firewall.



- 3) Support the column and remove the bolts that retain the under dash mounting clamp.



Original Steering Column

- 4) Remove the factory steering column from the vehicle.

Steering Box and Linkage Removal



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

*Idler Arm
Mounting Bolts*



2) Remove the two bolts that retain the idler arm to the frame rail.



3) Remove the cotter pins and castle nuts and separate the outer tie rod ends from the spindles.

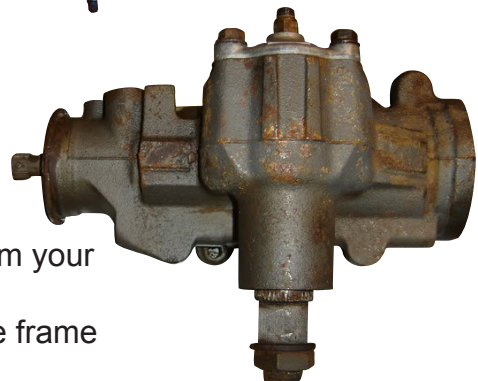


4) Next, remove the steering linkage from the car.



5) If you have power steering, remove the lines from your power box, pump and pump brackets.

6) Remove the three bolts that retain the box to the frame rail and remove the box from the car

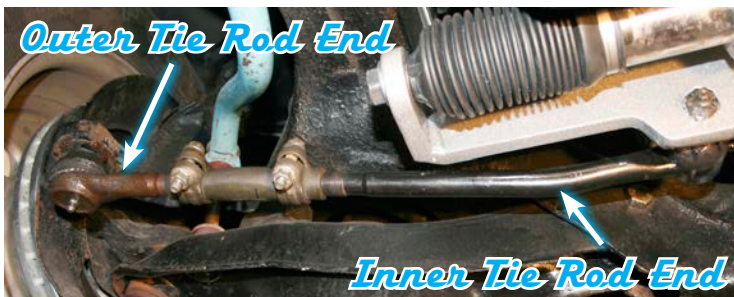
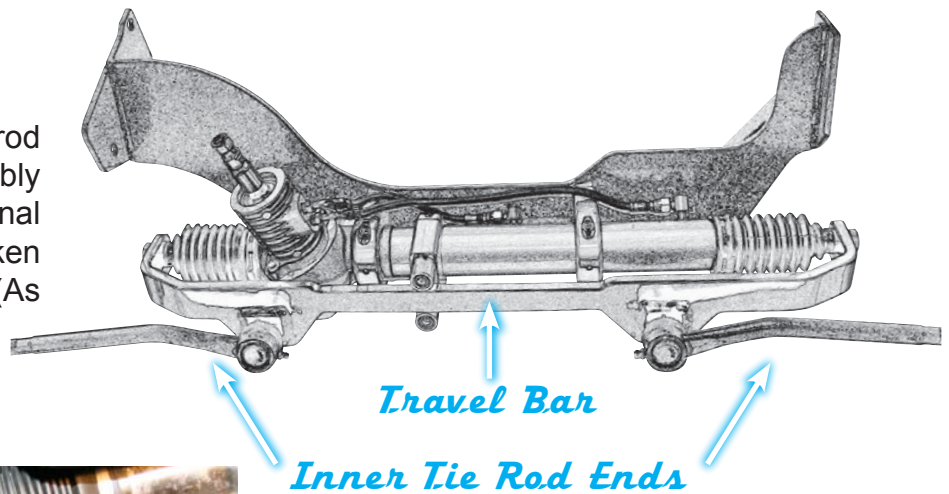


Flaming River Rack and Pinion Cradle Installation



1) Install the rack and pinion cradle by sliding it into place between the frame rails, installing the new hardware using three 7/16" bolts where the gear box was mounted and two 3/8" bolts where the idler arm was located. Tighten the 7/16" nuts and bolts to 50-65 ft lbs and the 3/8" nuts and bolts to 40-45 ft lbs.

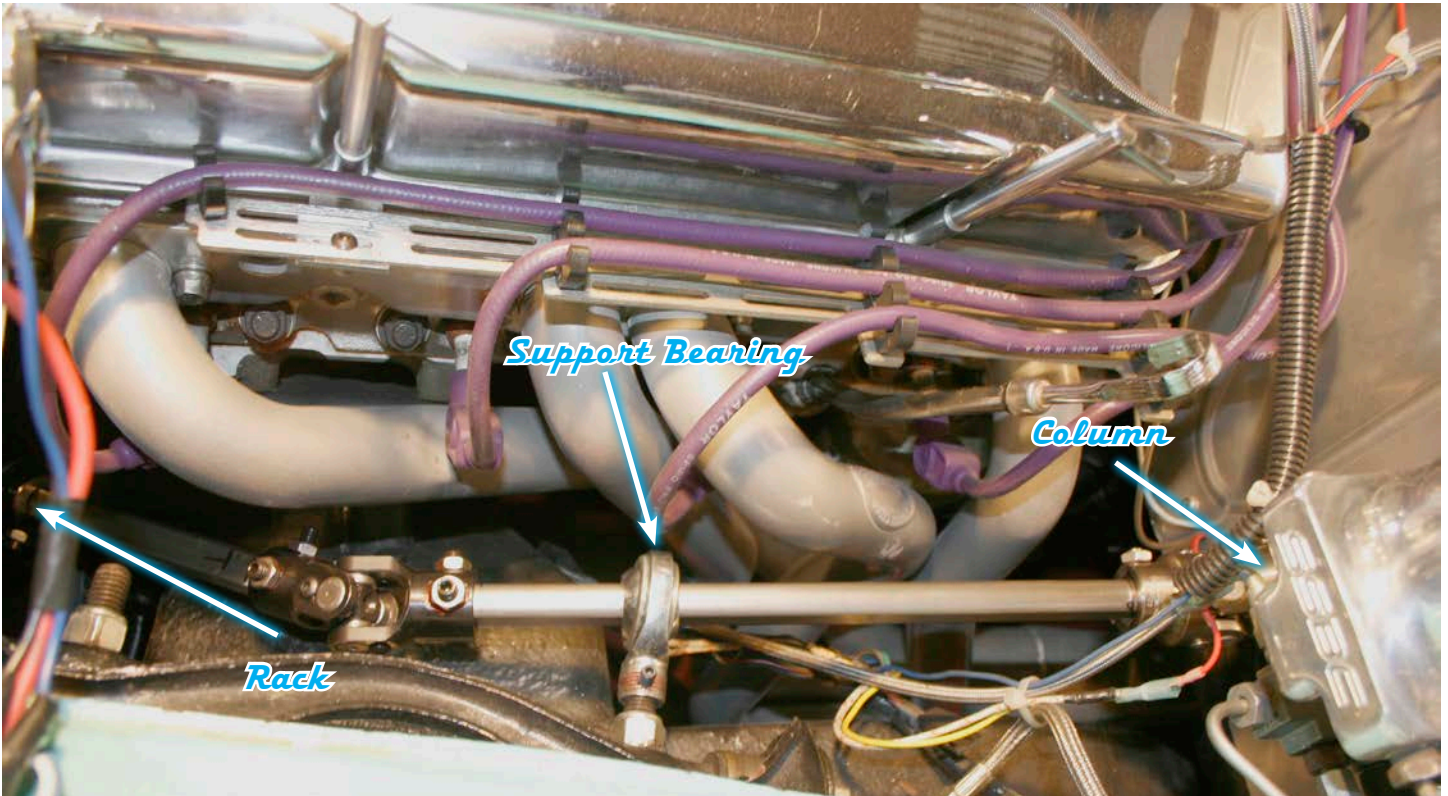
2) Install the inner and outer tie rod assembly into the travel bar assembly and adjust tie rods until the original zerk to zerk measurement taken before disassembly is obtained. (As shown on page 5)



3) Install the outer tie rod ends into the spindle and tighten the castle nuts to 30-40 ft lbs. Make sure to install cotter pins into the castle nut and tie rod end and bend the tabs over for security.

Universal Joint System

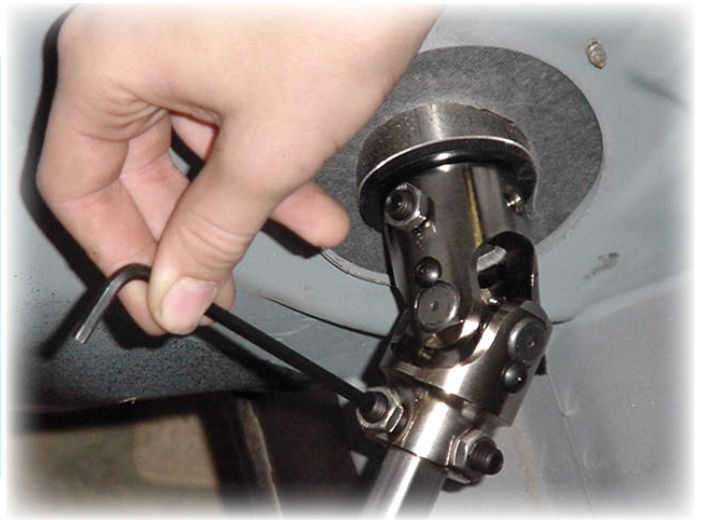
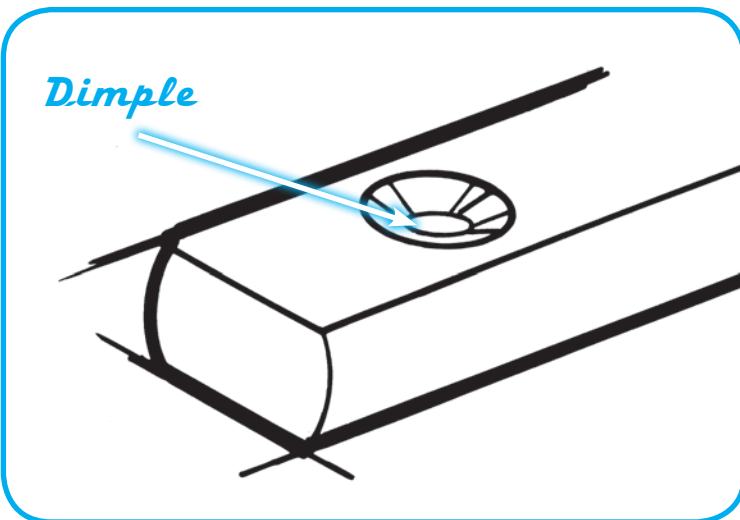
1) Install support bearing onto the rear control arm bolt (Picture below). Note: The angle of this mount is set for most applications. Some adjustment may be necessary for the correct angle and u-joint alignment.



2) We recommend the use of $\frac{3}{4}$ " wood dowel rod to mock up the steering shaft to obtain the correct length of the shafts.

3) Install your shaft kit and snug each set screw so that it will leave a mark in the shafts.

4) Remove shaft and dimple each setscrew mark using a $\frac{1}{4}$ " drill bit. (As shown below.)



5) Re-install the shafts using red loc-tite thread locker on the set screw threads. Tighten each setscrew to 25 ft. lbs. Tighten all lock nuts securely. We recommend that you inspect setscrews periodically for tightness.

Flaming River Column Installation

- 1) Position the included floor mount to the bottom of the steering column, do not fully tighten the mount until the column is in it's final position.
- 2) Install the column in the vehicle and install the stramp clamp in order to hold the column in place. (See below) Next re-adjust floor mount to fit snug to the floor and make any final adjustments before tightening all the clamps.
- 3) Connect the wiring adapter to your vehicle wiring harness. (See diagram below)



*Flaming River
Swivel Floor Mount*

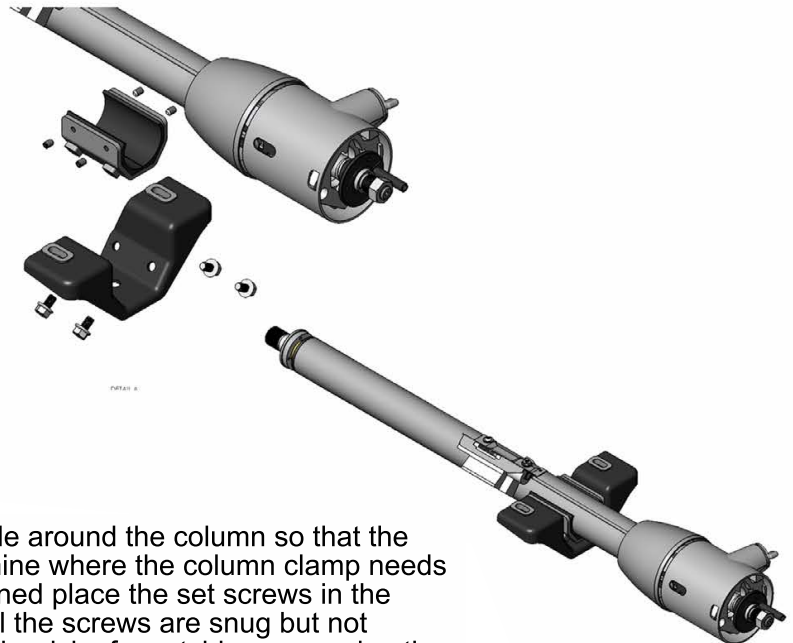
Flaming River Column Wiring

<u>Wiring Circuit</u>	<u>Pin Location</u>	<u>Column Wiring Color</u>
Brake Light Switch	P	White
Right Rear Turn Signal	N	Dark Green
Left Rear Turn Signal	M	Yellow
Turn Signal Power	L	Purple
Hazard Power	K	Brown
Right Front Turn Signal	J	Dark Blue
Left Front Turn Signal	H	Light Blue
Horn	G	Black

Color Verification to be completed before disassembly

- Brake Light Switch : _____
- RR Turn Signal : _____
- LR Turn Signal : _____
- Turn Signal Power : _____
- Hazard Power : _____
- RF Turn Signal : _____
- LF Turn Signal : _____
- Horn : _____

Stramp Clamp Installation

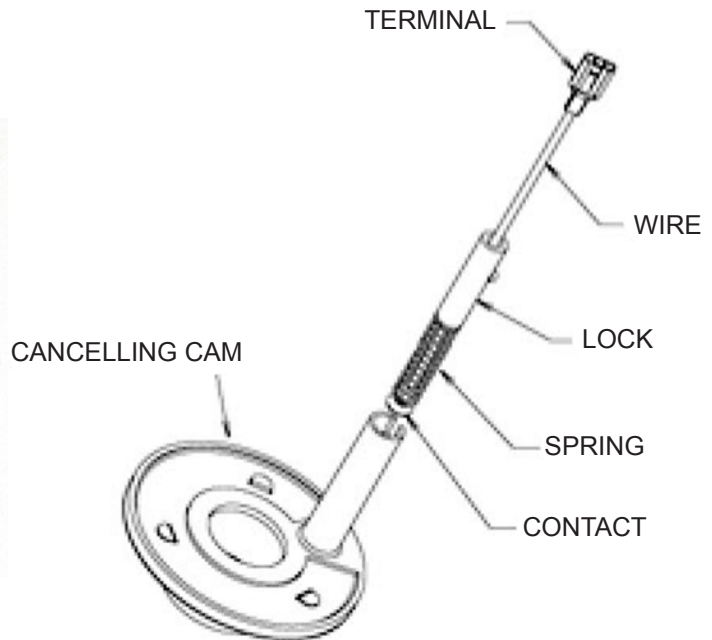
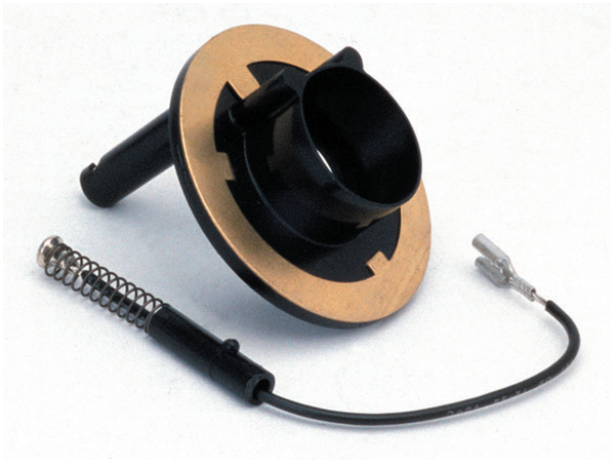


Hold the original mounting bracket from the vehicle around the column so that the mounting holes line up with the frame and determine where the column clamp needs to be placed on the column. Once this is determined place the set screws in the sides of the column clamp as shown. Tighten until the screws are snug but not cutting thru the rubber membrane or you will run the risk of scratching or marring the tube.

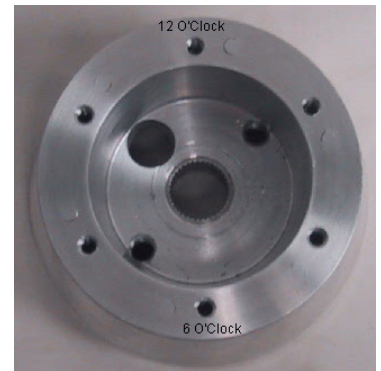
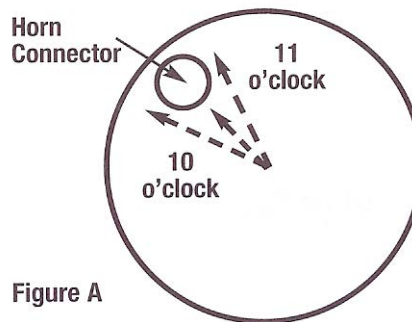
Mount the column clamp to the original mounting bracket using the original hardware (5/16-18 bolts) and then mount the bracket to the frame under the dash.

Steering Wheel Installation

1) Install horn contact kit into canceling cam tube and turn to lock.

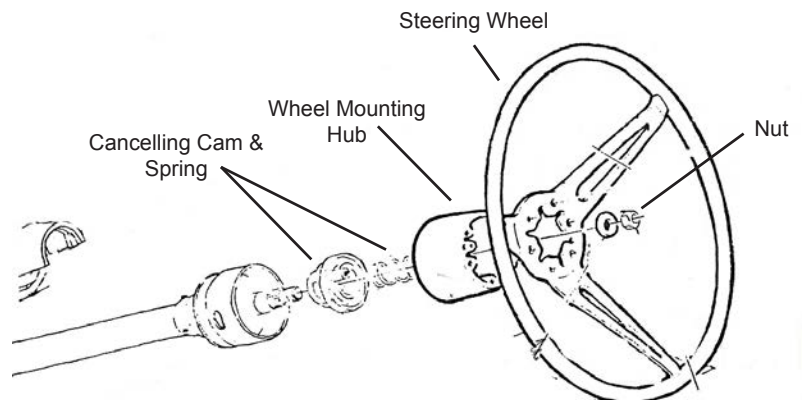


2) Be sure Rack and Pinion is in the center position before starting install of steering wheel. Align steering wheel adapter so that the canceling cam hole is at approx the 11 o'clock position and that one of the steering wheel mounting holes is at the 12 o'clock position. (After 1st test drive, it may be necessary to re-center wheel)

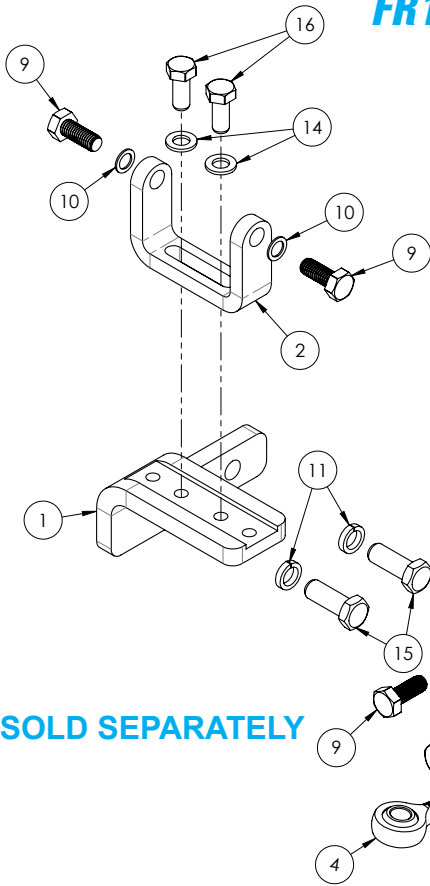


3) To install the wheel adapter run the horn contact wire through the hole for the canceling cam and place the adapter on to the splined column shaft.

4) Tighten the adapter-retaining nut securely until the adapter is approximately 1/16" away from the column shroud. (Overtightening can cause wheel to rub)



FR1612 Small Block Chevy Power Steering Pump Bracket



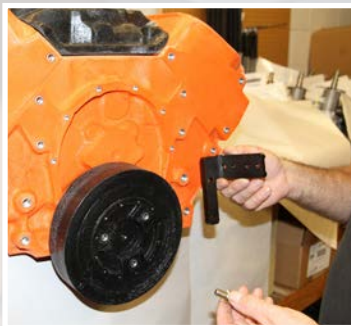
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	100632	BRACKET, MOUNT PUMP-MOTOR SB
2	1	100633	BRACKET, MOUNT PUMP PS
3	1	100667	HEIM JOINT, END ROD 3/8-24 RH
4	1	100668	HEIM JOINT, END ROD 3/8-24 LH
5	1	100720	SPACER, ADJ 0.62 X 2.52 W/ 3/8-24 RH-LH
6	1	100721	SPACER, 0.392 X 0.62 X 1.00 ALUM
7	1	100722	BOLT, 3/8-16 X 3.00 HEX HD GR8
8	1	100723	WASHER, FLAT 0.39 X 0.62 X .05
9	3	100724	BOLT, M8 X 1.25 X 20 HEX HD GR10.9
10	3	100725	WASHER, FLAT 0.32 X 0.47 X .04
11	2	100726	WASHER, LOCK SPLIT 3/8 HIGH COLLAR
12	1	100728	NUT, 3/8-24 JAM LH
13	1	100729	NUT, 3/8-24 JAM RH
14	2	100730	WASHER, FLAT 0.32 X 0.57 X .06
15	2	100779	SCREW, 3/8-16 X 1.00 HEX HD GR8
16	2	102725	SCREW, 5/16-18 X .75 HEX HD GR8

SOLD SEPARATELY



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Power Steering Pump Installation/Small Block Chevy



Install L-shaped bracket (1) on engine with bolts (15) and lockwashers (11) supplied



Install pump bracket (2) to L-shaped bracket (1) with bolts (16) and washers (14) supplied



Install pump to bracket (2) using bolts (9) and washers (10) supplied

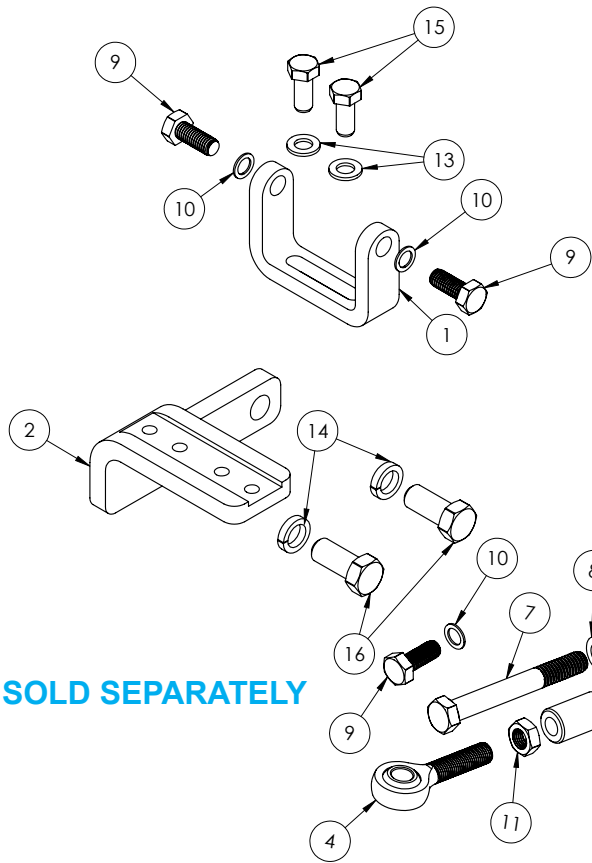


Install adjuster to pump using bolt (9) and washer (10) supplied



Remove upper water pump bolt. Install spacer (6) and adjuster with bolt (7) and washer (8) supplied

FR1613 Big Block Chevy Power Steering Pump Bracket



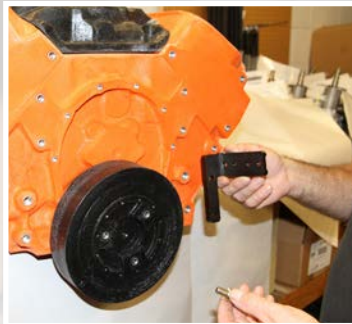
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	100633	BRACKET, MOUNT PUMP PS
2	1	100649	BRACKET, MOUNT PUMP-MOTOR SB
3	1	100667	HEIM JOINT, END ROD 3/8-24 RH
4	1	100668	HEIM JOINT, END ROD 3/8-24 LH
5	1	100720	SPACER, ADJ 0.62 X 2.52 W/ 3/8-24 RH-LH
6	1	100721	SPACER, 0.392 X 0.62 X 1.00 ALUM
7	1	100722	BOLT, 3/8-16 X 3.00 HEX HD GR8
8	1	100723	WASHER, FLAT 0.39 X 0.62 X .05
9	3	100724	BOLT, M8 X 1.25 X 20 HEX HD GR10.9
10	3	100725	WASHER, FLAT 0.32 X 0.47 X .04
11	1	100728	NUT, 3/8-24 JAM LH
12	1	100729	NUT, 3/8-24 JAM RH
13	2	100730	WASHER, FLAT 0.32 X 0.57 X .06
14	2	100732	WASHER, LOCK SPLIT 7/16 HIGH COLLAR
15	2	102725	SCREW, 5/16-18 X .75 HEX HD GR8
16	2	BOLT-7/16-14X1	BOLT, 7/16-14 X 1.00 HEX GR8

SOLD SEPARATELY



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Power Steering Pump Installation/Big Block Chevy



Install L-shaped bracket (2) on engine with bolts (16) and lockwashers (14) supplied



Install pump bracket (1) to L-shaped bracket (2) with bolts (15) and washers (13) supplied



Install pump to bracket (1) using bolts (9) and washers (10) supplied



Install adjuster to pump using bolt (9) and washer (10) supplied

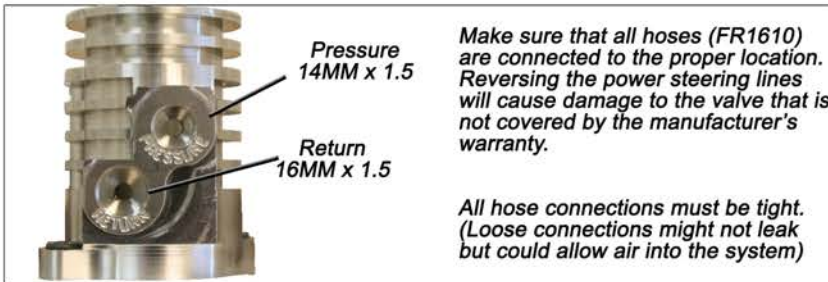


Remove upper water pump bolt. Install spacer (6) and adjuster with bolt (7) and washer (8) supplied



Instruction Bulletin #1021

Correct Bleeding Procedure for Flaming River Power Rack & Pinion Systems.



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".

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

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.

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.

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Additional Installation Products

HIGH OUTPUT ALTERNATORS



Die Cast w/Chrome Housing
 FR1108C 170 Amp
 FR1109C 240 Amp



FR20160TN
 Cascade Tan

FR20150LG
 Waterfall Light Grey

Waterfall
 Wheel Adapter
 FR20150HGAD

Cascade
 Wheel Adapter
 FR20160AD



Pump Mounting Brackets
 FR1612, Small Block or
 FR1613, Big Block
**(Required for Install –
 Sold Separately)**



FR20130BK
 D Wheel Black

5/6 Bolt
 Wheel Adapter
 FR20119TA



Power Steering Hose Kit
 FR1610
**(Recommended for Install –
 Sold Separately)**

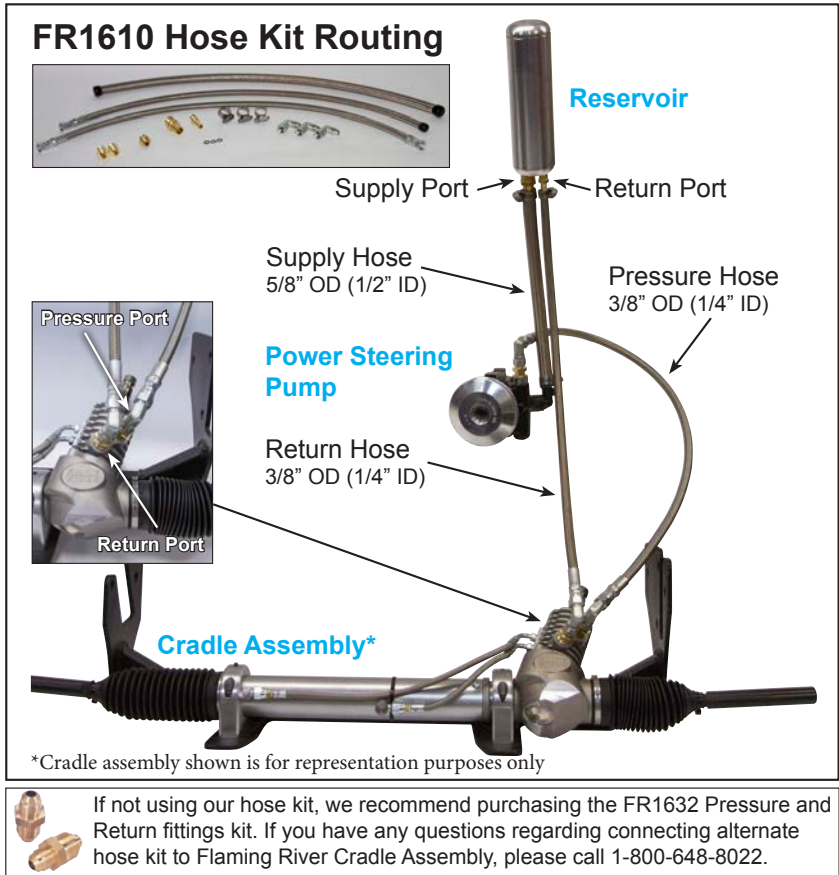
Camaro Outer Tie Rod Ends ES404RL/ES441RL
 and adjuster sleeves ES2004S
 (Purchase from local auto or online parts supplier)



ES404RL

ES441RL

ES2004S



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.



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