WARNING!!!
DO NOT USE SYNTHETIC POWER STEERING FLUID OR ATF WITH THE POWER RACK AND PINION UNIT. DOING SO MAY DAMAGE THE SEALS WITHIN THE RACK TUBE.

READ THIS MANUAL IN ITS ENTIRETY PRIOR TO BEGINING INSTALLATION.

SAFETY PRECAUTIONS
PARTS LIST
INSTALLATION
ADJUSTMENT
CARE AND MAINTENANCE

READ AND SAVE THESE INSTRUCTIONS
Our products are manufactured to the highest quality standards. To ensure your complete satisfaction, please follow these simple steps:

**Read the entire Owners Manual before you begin installation.** The Owners Manual included with your products has been designed to make the installation of your products easy and trouble free.

**Returns:**
Merchandise can only be returned within 30 days of the original shipping date. No returns on special order items or shipping and handling fees. Returns will only be accepted on parts that have not been installed or modified; are still in the original package; and are in like-new condition. A 25-percent restocking fee will be applied to all returned merchandise. If upon examination all parts are returned complete and in like-new condition, a credit will be issued less the 25-percent restocking fee. Credit can be applied toward any products offered through the Total Control Products or Chassisworks product catalogs, advertisements or websites. Before returning a part, you must contact Chassisworks to receive a "Return Authorization Number" (RA#), which must be clearly visible on the outside of the box. All shipping charges on return packages must be prepaid. C.O.D. shipments will not be accepted.

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There are NO WARRANTIES, either expressed or implied. Neither the seller nor manufacturer will be liable for any loss, damage or injury, either direct or indirect, arising from the use or inability to determine the appropriate use of any product. Before any attempt at installation, all drawings and/or instruction sheets should be completely reviewed to determine the suitability of the product for its intended use. In this connection, the user assumes all responsibility and risk. We reserve the right to change specification without notice. Further, Chris Alston’s Chassisworks, Inc., makes NO GUARANTEE in reference to any specific class legality of any component. MOST PRODUCTS ARE INTENDED FOR RACING AND OFF-ROAD USE AND MAY NOT BE LEGALLY USED ON THE HIGHWAY. The products offered for sale are true race-car components and, in all cases, require some fabrication skill to install.

NO PRODUCT OR SERVICE IS DESIGNED OR INTENDED TO PREVENT INJURY OR DEATH.

**OUR PLEDGE TO ASSIST YOU**
Our Technical Support Department can be contacted by email or through our online discussion forum for additional help and tips if needed.

**Email:** techsupport@totalcontrolproducts.com  **Forum:** www.totalcontrolproducts.com/support.html

Additional products and replacement components are available through our sales office during regular business hours.

Monday - Friday from 7:00 am to 5:30 pm PST.  
Phone: 916-388-0288  
Website: www.totalcontrolproducts.com

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INTRODUCTION

You can update your classic automobile to Rack & Pinion steering. Our kits have no effect on caster/camber alignment or brake systems. If you have alignment, suspension or brake problems after installation of the rack and pinion kit, the conditions were probably existing prior to the installation. Inspect your cars suspension system prior to installation of the rack and pinion kit. We recommend taking your car to a reliable alignment shop to adjust the settings.

Parts list and general maintenance information are available on page 9.

INSTALLATION INSTRUCTIONS

1) ELECTRICAL - Remove the battery cable from the negative side of the battery.

2) RAISE VEHICLE -
   2a) On 64-early 67 Mustangs with non-collapsible steering shafts, you must raise the car to a level high enough to remove the steering box from underneath.
   2b) On Late 67-70 Mustangs it will be necessary to raise the car high enough to work comfortably underneath it prior to removing the factory steering system.

   THINK SAFETY FIRST!!!!!! ALWAYS USE CAUTION WHEN LIFTING THE CAR

WARNING!!! Always use approved automotive jack stands. All work must be performed on a concrete floor with the jack stands underneath the framerails of the car. Floor jacks must only be used to raise the car. Never depend on a floor jack to support the car!!!

3) REMOVAL OF FACTORY COMPONENTS - Refer to diagrams on pages 12 & 13.
   Remove tubular crossmember that is bolted between the frame rails. Two large bolts should be removed to take out the crossmember. This will be the mounting location for the rack.

   3a) Power steering cars converting KRC Power Steering Pump
       Disconnect the two power steering lines between the power steering pump and the control valve at the valve end of the lines. Loosen fastening bolts to power steering pump and swing pump down to remove tension on the fan belt. Remove fan belt. Remove all power steering pump brackets. You should now be able to remove the pump, brackets and hoses as one complete assembly. Use a suitable container to drain the fluid and dispose of in an environmentally safe manner.

   3b) Steering Linkage -
       Remove inner tie rod from center link using pickle fork or similar tool. Remove the center link from the pitman arm using a pickle fork or similar tool. Unbolt ram bracket from frame (factory power steering only). Unbolt idler arm from car. Remove the system from the car.
4) STEERING COLUMN REMOVAL -
   4a) 64-Early 67 (non-collapsible shaft) - Remove the steering wheel nut and steering wheel. Disconnect turn signal harness from under the dash. Unbolt the firewall seal assembly. Remove steering column bracket from under the dash. Remove the column from the car. Make sure to save the upper steering shaft bearing and spring. You must retain the factory seal, however discard the factory seal retainer.

   4b) Late 67-70 (collapsible shaft) - Unbolt the rag joint from the steering box. Unbolt column support and seal assembly from inner firewall. Disconnect the turn signal harness from under the dash. Remove the underdash support bracket. Remove the column from the car.

5) STEERING BOX REMOVAL - Locate the three bolts that run through the driver’s side of the car frame into the steering box housing. Remove all three.

   5a) 64-Early 67 (non-collapsible shaft) - The steering box can be lowered under the car for removal at this time. If your car is a 1965 V8 with original style motor mounts, it may be necessary to un-bolt the motor mounts and raise the engine. 1965 V8 original style motor mounts place the engine in a higher position then the updated 66-67 style mounts and interfere with the removal of the steering box.

   5b) Late 67-70 (collapsible shaft) - Remove steering box from car.

6) STEERING COLUMN PREPARATION 65-EARLY 67 (long shaft) -
   6a) With the column out of the car place the steering column tube into a vice and carefully cut off the tube with a hack saw or similar tool. Overall length should be 29 5/16” after cutting. Be careful to cut this tube straight, this end of the steering tube will rest against the bearing retainer assembly. Carefully debur the end of the tube.

   6b) Slide column floor mount assembly onto column tube with the two bent tabs pointing towards the top of the column. Install supplied steering shaft and bearing retainer assembly onto the bottom end of the steering column tube, make sure that the retainer bottoms against the column tube. Install the upper column bearing and spring. Install steering wheel and steering wheel nut. Temporarily tighten steering wheel nut. (see foot note #1) Use a 9/64” or .140” diameter drill bit and drill holes into the column through the bearing retainer. Remove steering wheel nut, steering wheel, steering shaft and bearing assembly to remove the metal chips from the inside of the column tube. Re-install the steering shaft and bearing retainer assembly, install the upper column bearing and spring, temporarily install the steering wheel and nut, tighten to 10 ft-lbs. The steering wheel will need to be indexed after the car is on the ground and has been driven, this will be done in step #14. Install three stainless steel Phillips sheet metal screws to attach the bearing retainer to the column tube.

Foot Notes: #1. Steering wheel to column clearance (1/16” to 3/32”). If your steering wheel is too far or too close to the steering column tube, you have two options. If the steering wheel touches column, you must cut an appropriate length from end of column tube to allow clearance. If your steering wheel is too far from tube, 3/4” inside diameter shims or washers can be placed between the retaining clip and roller bearing. Torque steering wheel attaching nut to 50 ft. lbs.
7) STEERING COLUMN PREPARATION LATE 67-70 (collapsible shaft) -

7a) Remove the slip shaft from the end of the steering column. Remove the plastic sleeve from the bottom of the steering column and tap the inner sleeve of the steering column flush with the outer column tube.

7b) Install the supplied slip shaft and bearing retainer assembly onto column making sure that the new female slip shaft engages with the internal male shaft. You may have to tap the new slip shaft onto the internal shaft until the blue bearing retainer is bottomed against the steering column. Use a 9/64” or .140 diameter drill bit and drill holes into the column through the bearing retainer. Remove the bearing retainer assembly and steering shaft to remove the metal chips from the inside of the steering column. Re-install the steering shaft and bearing retainer assembly. Install the three stainless steel Phillips sheet metal screws to attach the bearing retainer assembly to the steering column.

8) STEERING COLUMN INSTALLATION -

8a) 64-EARLY 67 (non-collapsible shaft) - Install factory firewall seal over the end of the assembled steering column. Re-install the column assembly through the hole in the firewall. Adjust the steering column to its original height and reinstall the upper dash bracket. Attach the column floor mount support assembly and factory firewall seal using original sheet metal screws from the factory plate. Re-connect the turn signal harness.

8b) LATE 67-70 (collapsible shaft) - Slide the column assembly through the hole in the firewall. Adjust the steering column to its original height and install the upper dash bracket. Reattach the factory lower column support and seal assembly using the original screws. Reconnect the turn signal harness.

9) RACK AND PINION INSTALLATION - Remove the two inner control arm brackets and the passenger side outer bracket from the rack and pinion by removing the two 5/16” Allen head bolts in each clamp.

9a) 1964 - 1966 - Bolt inner brackets to the lower control arm mounting points using the 1/2” x 4-1/2” bolts, 1/2” flat washers and 1/2” nylock nuts. It may be necessary to use the supplied round 1/4” thick spacers in between the brackets and the body to align the brackets with the rack and pinion tube. The mounting tabs on the inner brackets should point outward. Do not tighten the bolts at this time, the brackets must be able to move.

9b) 1967 - 1970 - You must eliminate the stock eccentric bolts using the supplied eccentric eliminator plates (TCP EE-02) these plates allow the camber to be adjusted to 11 different positions. Use 2 plates per side of the vehicle. Bolt inner control arm brackets to lower control arm mounting points using the 1/2” x 4-1/2” bolts, 1/2” flat washers, eccentric plates and 1/2” nylock nuts. The mounting tabs of the inner brackets must point inward. Do not tighten the bolts at this time, the brackets must be able to move.

9c) Mount passenger side outer bracket to frame using the supplied 1/2” bolt, 1/2” lock washer and 1/2” flat washer. Do not tighten at this time.
9d) With assistance install the rack and pinion unit into the passenger side frame clamp using one clamp and two 5/16" Allen bolts. Do not tighten at this time. You may need to use the slotted 1/4" thick square spacers to space the outer rack brackets away from the frame rails to provide clearance for the oil pan.

9e) The supplied intermediate shaft will need to be cut to fit between the two universal joints as shown in the illustration. Estimated lengths are listed below. You will need to measure to determine the correct length for your application.

- Manual Big Block - 10"
- Manual Small Block - 9"
- Power Big Block - 6-1/8"
- Power Small Block - 5-1/8"

Install the intermediate shaft assembly onto the end of the steering column shaft. Tighten the U-joint set screw using a 5/32" Allen wrench, torque to 15-17 ft-lbs. Tighten the U-joint set screw nut to 15-17 ft-lbs. Raise the left end of the rack and install the second U-joint on the splined end of the rack and pinion input shaft.

Once the spline is engaged the left side of the rack and pinion can now be bolted to the frame using the 1/2" bolt, lock washer, and flat washer. If you used a 1/4" spacer in step 9d you will need to use the second spacer between the driver side frame bracket and the frame. It may be necessary to slide the steering column up or down to insure that the intermediate steering shaft clears the clutch linkage, frame, etc.

9f) Install clamps to inner brackets using 5/16" Allen bolts. Now all brackets can be tightened, torque all bolts in an even manner - similar to torquing a head gasket. This should be done in four stages to insure that everything stays in alignment. Tighten all U-joint set screws and nuts.

10) CONNECTING TIE-ROD ENDS TO THE CENTERLINK
Remove the center link from the rack and pinion. Before connecting the Tie-rod assemblies to the center link make sure that they are similar in length on each side of the car before bolting them to the centerlink. The tie-rod sleeve clamps must be facing the rear of the car to provide maximum clearance between the tie-rods and the rack.

10a) 1964 - 1966 (TCP TIER-01)
Slide tie-rod adapters on the inner tie-rod ends and insert through the outer holes on the center link. Use the 7/16" flat washers under the castle nuts and torque to 35ft-lbs. Line up cotter pin hole and insert cotter pin. Wrap the ends of the pin around the nut to insure that the cotter pin does not make contact with the rubber boots or rack housing. Install the centerlink to the rack and pinion assembly using the provided flat washers and the nylock nuts. Torque the nuts to 75 ft-lbs.
10b) 1967 - 1969 excluding BOSS (TCP TIER-02)
Slide tie-rod adapters on the inner tie-rod ends and insert through the inner holes on the center link. Big Block cars will use the hole located on the raised tab. Use the 7/16” flat washers under the castle nuts and torque to 35ft-lbs. Line up cotter pin hole and insert cotter pin. Wrap the ends of the pin around the nut to insure that the cotter pin does not make contact with the rubber boots or rack housing. Install the centerlink to the rack and pinion assembly using the provided flat washers and the nylock nuts. Torque the nuts to 75 ft-lbs.

10c) 1969 BOSS and 1970 (TCP TIER-03)
Slide tie-rod adapters on the inner tie-rod ends and insert through the inner holes on the center link. Big Block cars will use the hole located on the raised tab. Use the 1/2” flat washers under the castle nuts and torque to 35ft-lbs. Line up cotter pin hole and insert cotter pin. Wrap the ends of the pin around the nut to insure that the cotter pin does not make contact with the rubber boots or rack housing. Install the centerlink to the rack and pinion assembly using the provided flat washers and the nylock nuts. Torque the nuts to 75 ft-lbs.

11) TIGHTENING STEERING COLUMN - Tighten all steering column bolts under the dash and at the firewall.

12) FINAL INSPECTION - As a precautionary measure, it is critical that you re-check all work to make sure that all bolts are properly torqued and that there is no interference with any moving parts. If you are driving your car to the alignment shop you should now set the toe-in as close as possible with a tape measure.

13) RECONNECTING THE BATTERY CABLE - Reconnect the negative battery cable.

14) PRE-ALIGNMENT SETTINGS FOR THE RACK&PINION - On the passenger side tie-rod sleeve, make sure that the sleeve clamps are facing the rear of the car to clear the end of the rack tube at full right-hand lock. The steering wheel should now be indexed and the steering wheel nut should be torqued to 50 ft-lbs.

NOTE: When the car is aligned make sure that the rack is centered and the tie-rod assemblies are close to the same length on each side of the car before proceeding with the alignment.

*Refer to page 9 for recommended alignment settings.*
Installation of the power rack and pinion requires the hydraulic hoses to be routed and hooked up to the TCP KRC power steering pump and remote reservoir. Instructions for mounting the pump and assembly of the hoses are provided in their respective kits.

Before proceeding the following steps must be completed.

- Reservoir securely mounted in area of power steering pump
- Pump securely mounted and aligned with an available pulley

1) With one hose end installed, hook the hose end to its appropriate fitting.

2) Route the hose as you intend to for the final installation.
   When installing and routing the hydraulic hoses it is critical to keep them away from all heat sources and sharp edges. Every car will be a little different depending on engine size, header or manifold configuration, etc. If routing close to the exhaust is unavoidable, it may be necessary to use protective hose wrapping available from Earls, Aeroquip or Parker.

   Pump to Rack: -6 (smaller) hose  
   Rack to Reservoir: -6 (smaller) hose 
   Resevoir: to Pump: -10 (larger) hose

3) Mark the hose for the desired length then remove for cutting and assembly of the second hose end as outlined in the hose kit instructions. Hoses should not be routed and secured in a way that places tight bends in the hose or does not allow any flexibility. Large sweeping bends and some slack to allow engine movement and hydraulic pressure changes is mandatory for optimum performance.

4) Thoroughly clean the inside of hoses as described in the hose kit instructions to prevent debris from contaminating the pump or rack and pinion.

5) Reinstall finished hoses and secure or wrap as necessary.

6) INITIAL STARTUP - When filling the power steering pump it is critical to use a petroleumbased (NON-SYNTHETIC) power steering fluid. It will normally take 1 to 1.5 quarts of fluid to fill the system.

   6a) Fill the reservoir
   6b) Start the car with the wheels off the ground
   6c) Rotate the steering wheel lock to lock 3 to 4 times to purge the air from the system. Be sure to keep the reservoir topped off during this process. Upon initial startup there may be some noise caused by air. Most systems will need to set overnight to allow small air bubbles to work themselves out.

- Do not use synthetic power steering fluid of ATF with the TCP Rack and Pinion unit.
- The TCP Rack and Pinion has been matched to the flow characteristics of the KRC power steering pump. Any substitutions of equipment will give unpredictable results.
APPENDIX A

RACK AND PINION PARTS LIST

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<tr>
<th>Part Prefix</th>
<th>Description</th>
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<tr>
<td>RCKX-XX</td>
<td>Rack and Pinion Set</td>
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<td>Rack and Pinion Assembly with Brackets</td>
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<td>Hardware Bag</td>
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<td>COLM-XX</td>
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<td>Column Bearing Retainer Assembly</td>
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<td>Floor Mount (if applicable)</td>
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<td>ISFT-XX</td>
<td>Intermediate Shaft Set</td>
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<td></td>
<td>Lower Universal Joint (splined)</td>
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<td>Rack Mount Spacers (if applicable)</td>
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PINION ADJUSTMENT

Because of the mechanical nature of a rack and pinion system there is an initial “break-in” period and it will show signs of wear after years of frequent use. A gear adjustment feature is designed into the rack to make adjustments to keep the steering as precise as new.

The large jam nut at the back of the pinion housing will need to be loosened to adjust the set screw in the center. Adjustment are made in roughly 1/16 of a turn increments or just a few degrees. Tightening this set screw removes play and loosening will free up movement of the rack gear. Hold the set screw in position as the jam nut is tightened to prevent it from changing the intended adjustment setting.

RACK AND PINION TORQUE SPECIFICATIONS

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<th>Thread Dia.</th>
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<tr>
<td>2) Lower control arm brackets</td>
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<tr>
<td>3) Inner bracket clamp bolts</td>
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<tr>
<td>4) RH outer bracket clamp bolts</td>
<td>5/16-24</td>
</tr>
<tr>
<td>5) U-joint set screw and nut</td>
<td>5/16-24</td>
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<tr>
<td>6) Centerlink to R&amp;P unit</td>
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<td>7) Steering wheel nut</td>
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RECOMMENDED ALIGNMENT SETTINGS

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<td>2 1/2 - 3 pos.</td>
<td>1/16” - 1/8” In</td>
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