

INSTALLATION GUIDE



Manual Rack & Pinion 03 For 1960 – 1965 Falcon/Comet

P/N: TCP RCKM-03



DESCRIPTION:

MANUAL TCP RACK & PINION WITH MOUNTING BRACKETS AND HARDWARE ONLY

APPLICATIONS:

FITS '60 – '65 FALCON/COMET WITH 6 CYLINDER OR SMALL BLOCK V8 ENGINES.

PARTS LIST

RACK & PINION

Item	Part Number	Description	Qty
1	TCP RCKM-03	Manual TCP Rack Assembly only Small Block Falcon	1

7900-186 Rack Mounting Kit (Subparts list)

2	7900-100	Rack Clamp Collar Drilled Half	3
3	7900-113	Rack Bracket Weldment, Passenger Small Block, TCP Rack	1
4	7900-115	Rack Lower Weldment Passenger Small Block, TCP Rack	2

7918-004 Hardware Bag (Subparts list)

A	3100-050C2.00Y	Bolt 1/2-13 x 2" Hex Head Cap Screw	2
B	3100-050C4.00Y	Bolt 1/2-13 x 4" Hex Head Cap Screw	2
C	3101-050-13C	Locknut 1/2-13 Nylon Insert 3/4 Hex	2
D	3103-031F1.00C	Allen Head 5/16-24 x 1" Socket Head Cap Screw	6
E	3108-050L-C	Lock Washer 1/2 Regular	2
F	3110-050-13-8C	Nut 1/2-13 Hex	2
G	3120-050S-Y	Washer 1/2 Flat SAE	8
H	3125-D4212	Hole Plug 1-5/8 ID Hole (not shown)	2
J	3108-031H-S	High Collar Lock Washer 5/16" (not shown – use with 'D')	6
K	7900-022	Spacer Frame Mount .25 Thick	2
L	7900-203	Spacer Frame Mount .125 Thick (not shown – use optional)	2
Z	7900-078	Spacer, .50 ID x 1.25 OD x .25 Thick (Supplied in TCP EE-03)	0

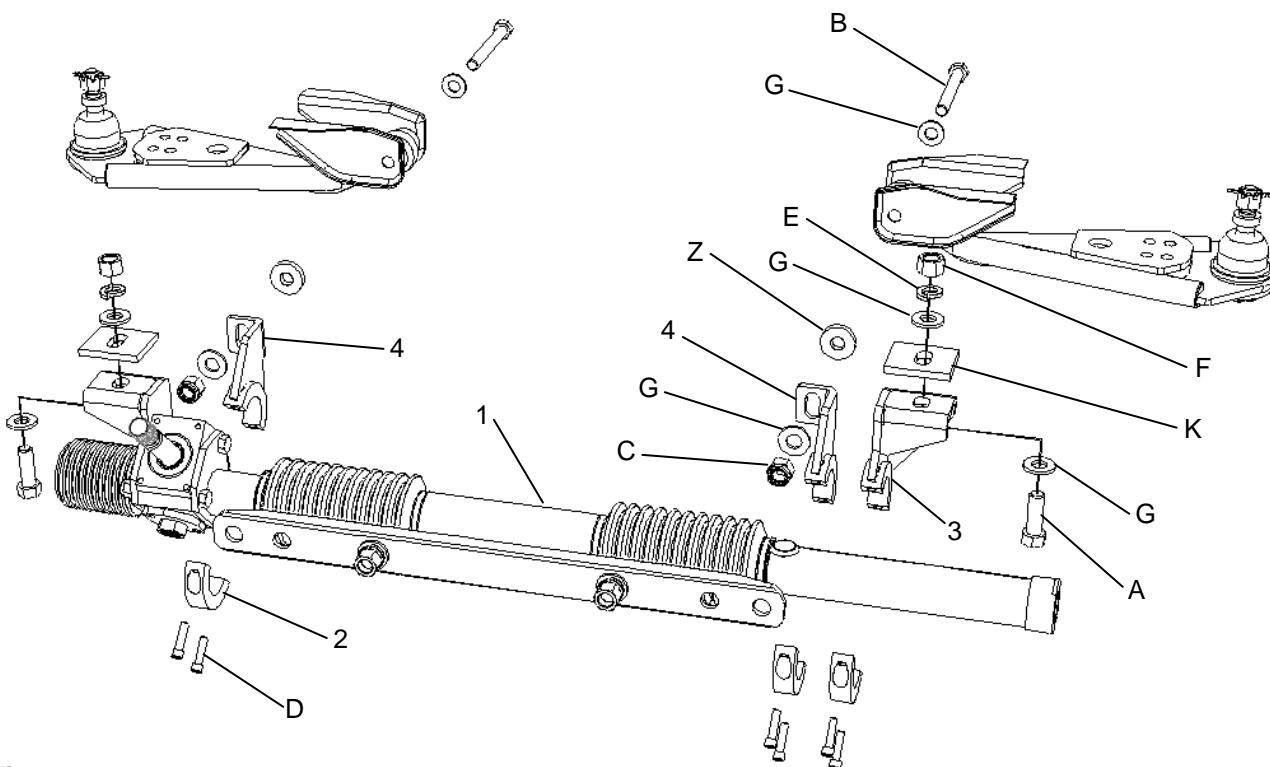


Figure 1-1

INSTRUCTIONS

1. Remove battery cable from negative side of battery.
2. Raise the vehicle using a two-post lift or jack and secure with jack stands so that the suspension hangs freely and the vehicle is safe to work underneath.
3. (OEM power steering cars only)
 - a. Disconnect the two power steering lines at the control valve. (Figure 2-1)
 - b. Fluid will be present, so be prepared to plug the lines or drain remaining fluid from system.
 - c. Unbolt power ram bracket from frame.
 - d. Loosen fastening bolts to power steering pump and swing pump down to remove fan belt.
 - e. Unbolt all power steering pump brackets and remove pump, brackets and hoses as an assembly.
4. Remove inner tie rods from center link. (Figure 2-3)
 - a. Straighten, and then remove cotter pins from castle nuts.
 - b. Remove castle nuts.
 - c. Pull inner tie rods from center link using ball joint separator or similar tool.
 - d. If replacing tie rod assemblies, the outer tie rod can be removed at spindle leaving tie rods

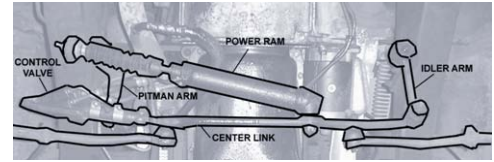


Figure 2-1

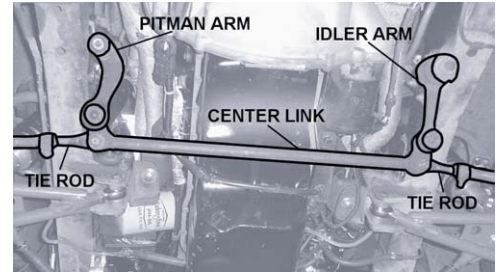


Figure 2-2



Figure 2-3



Figure 2-4



Figure 2-5

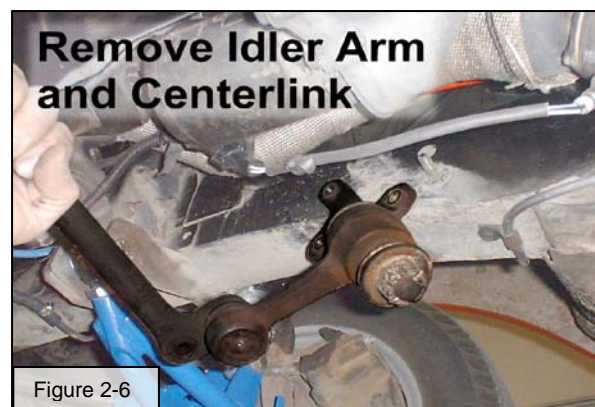


Figure 2-6

and center link as an assembly.

5. Separate center link from pitman arm.

(Figure 2-4)

- Straighten, and then remove cotter pin from castle nut.
- Remove castle nut.
- Separate center link from pitman arm using ball joint separator or similar tool.

6. Unbolt idler arm from car and remove steering system assembly. (Figures 2-5 & 2-6).

7. Removal of steering box is covered in Column Set Instructions (7903-COLM-XX).

8. Unbolt lower control arms at frame mounts.

- With suspension at full extension the lower control arm can be safely unbolted. Use caution as the arm may shift once the bolt is removed.

9. Drill a 1/8" pilot hole into the driver side frame rail, location of hole is shown in illustration (Figure 3-1).

- 1-5/8" back from lower arm mount;
- 1-7/8" in from outer edge of frame rail;

10. Drill 1/2" hole into driver side frame rail using 1/8" pilot hole as a guide.

11. Using a 1-5/8" standard or 1-1/4" pipe (1-5/8" outside diameter) hole saw, cut an access hole into the outside of the frame rail 1" directly above the 1/2" mounting hole. Refer to illustration (Figure 3-2).

- Use a file to remove any sharp edges.

12. Repeat steps 9-11 for passenger side frame rail.

13. The inner most edge of the driver side lower control arm mount must be ground to allow clearance for the mounting bracket.

- Refer to illustration (Figure 3-3).

14. Bolt both lower rack brackets (Item 4) to lower control arm mounts in orientation shown in Figure 1-1.

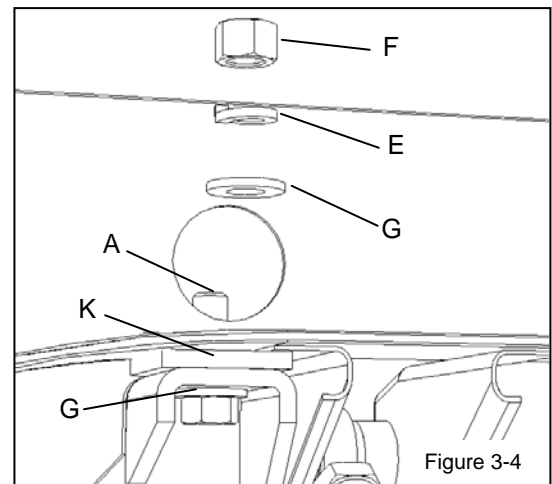
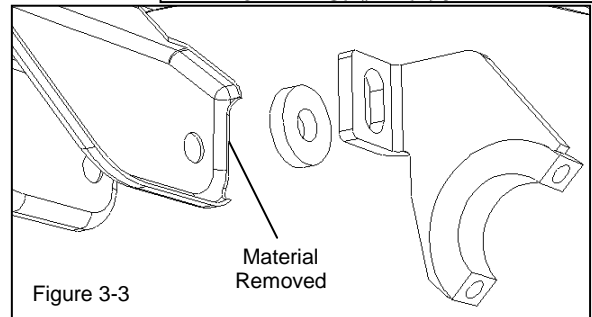
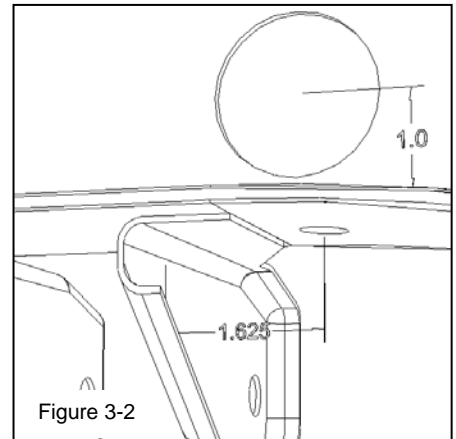
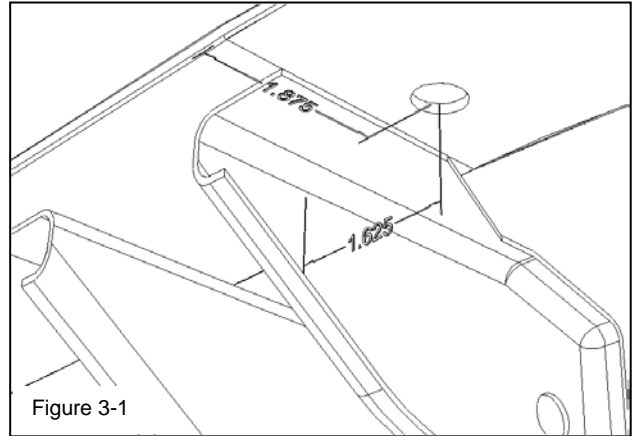
15. Refer to installation guide (7903-EE-03) packaged with Rack & Pinion Mount Spacers (TCP EE-03) for specific instructions regarding mounting hardware.

16. Bolts should be snug to remove slack but still allow brackets to pivot and slide vertically by hand.

17. Loosely bolt frame rack bracket (Item 3) to mounting point on passenger side frame rail using hardware indicated in illustration (Figure 3-4).

- Hardware must be inserted into access hole.
- Hold nut with finger while starting the bolt.

18. Raise rack and pinion assembly into position along brackets.



- a. Check for potential clearance issues between the steering linkage and frame rail. It may be necessary to notch the rail for clearance.
19. Loosely install clamp collar (Item 2) on passenger side frame rack bracket (Item 3).
20. Loosely bolt attached frame bracket of rack and pinion assembly to mounting point on driver side frame rail using hardware indicated in illustration (Figure 3-4).
 - a. Hardware must be inserted into access hole.
 - b. Hold nut with finger while starting the bolt.
21. The passenger side mounting bolt can now be tightened to remove slack.
 - a. Loctite must be applied to threads just below nut.
 - b. Apply pressure to rack & pinion assembly as bolts are tightened to properly seat rack tube into rack brackets (Items 3 & 4).
 - c. If frame brackets cannot be drawn up to frame rail without unseating the rack tube from lower rack brackets (Items 4), insert supplied spacers (Items K and/or L) between frame brackets and frame rails and repeat procedure.

Mounting Bracket Alignment

22. **IMPORTANT:** If any of the mounting brackets do not easily align with the vehicle mounting points do not use the hardware to draw the rack and brackets into place. Doing so will bend the rack tube and create a binding condition that hinders performance and could potentially damage the rack. Each of the mounting brackets is slotted and additional optional-use spacers are included to accommodate differences in chassis dimensions.
 - a) If the outer brackets do not seat against the frame rails, use the 1/8"- and/or 1/4"-thick spacers to take up any slack. Some installations may require uneven spacer stacks to correctly align the rack brackets. Each vehicle is different and will need to be shimmed accordingly.
 - b) The inner brackets at the lower control arm mounts should seat against a 1/4" thick spacer ('64-66) or 1/4" eccentric eliminator plate ('67-70) with the frame brackets seated squarely against the frame rails.
 - c) In rare instances it may be necessary to increase the slot length of the brackets to achieve a proper fit. For safety purposes the brackets are made from mild steel and can be modified with fairly common tools.
23. Verify that each of the three clamps are just tight enough to correctly align the bracket with the rack tube before lightly tightening the outer-bracket bolts into the frame rails.
 - d. The rack and pinion is now accurately positioned.

Install Intermediate Shaft

24. The intermediate shaft can now be measured and cut to the correct length.
 - a) Refer to installation guide (7903-ISFT-XX), packaged with your intermediate shaft set (TCP ISFT-XX), for specific instructions
 - b) The two inner-clamp halves and the driver-side frame bolt will need to be removed to allow installation of the intermediate shaft.

Intermediate shaft procedures must be complete before proceeding.

Mounting Bracket – Final Installation

The rack and pinion should be held in position by the outer frame brackets and properly seated against the lower rack brackets (Items 4 and 5).

NOTE: For ease of installation, initial tightening is performed with the weight of the vehicle carried by the frame rails instead of the suspension. Vehicles exhibiting signs of excessive chassis flex must loosen and re-torque all brackets and clamps after installation and adjustment have been completed, with the vehicle fully supported by the suspension. This allows the rack and pinion to be installed in a neutrally-loaded state. Spacer shims may need to be added or removed. Car ramps, a four-post drive-on lift, or ideally an alignment rack should be used.

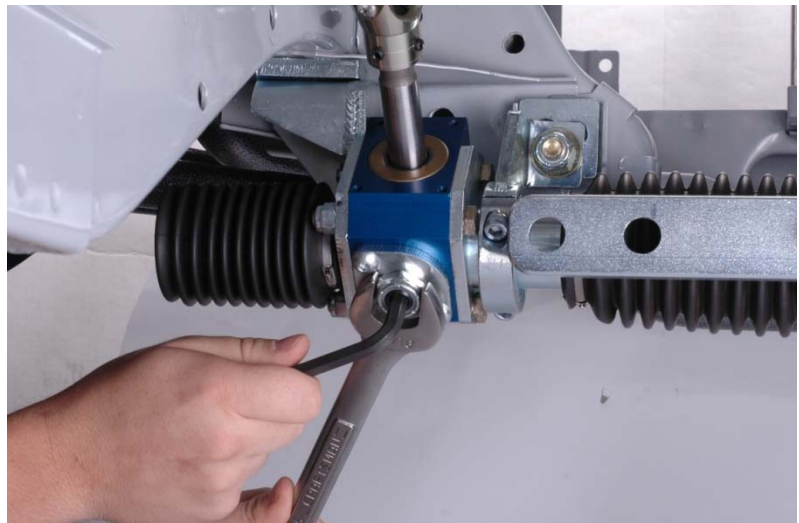
25. Install the clamps back onto the rack and evenly tighten to prevent the brackets from rocking, but still allowing rotation and sliding movement.
26. The procedure for tightening each of the four mounting brackets is similar to torquing down a cylinder head or intake manifold. The 1/2" bolts will be tightened progressively in the following order: driver-inner 1st, passenger-inner 2nd, driver-outer 3rd, passenger-outer 4th.
 - a) Begin by snugging up each bolt to remove any free play.
 - b) Verify that each bracket will seat squarely against its mounting surface without drawing the rack tube.
 - c) Make two to three passes through the tightening order to bring each bolt to its specified torque value.
 - Inner brackets – 60 lb-ft.
 - Outer brackets – 75 lb-ft.

Check for Binding

At each step of final tightening, the rack must be checked for binding or tightness throughout its range of travel. A slight bend in the rack tube or the tube being pinched into a slight oval will create additional friction against the rack's internal guide bushing or piston (power rack). Binding symptoms, probable causes, and solutions are explained in the following steps.

27. Using an even motion, turn the steering wheel from lock-to-lock. The amount of resistance should feel even from one end of the travel range to the other. Any noticeable increase or decrease in tension indicates a possible issue.

- a) **Notchy feeling or bump every 1/8th turn** – The pinion set screw adjustment at the base of the pinion housing is too tight. Loosen the large lock nut (15/16" hex) surrounding the set screw (5/16" allen) at the bottom of the pinion housing.



While lightly rocking the steering wheel back and forth, tighten the set screw until it is seated then loosen 1/4 turn. Hold the set screw in position with an allen wrench and tighten the lock nut. The steering should feel smooth and have zero to 1/8" of play at the steering wheel. Too loose of an adjustment allows excessive play at the steering wheel. Too tight of an adjustment makes steering overly sensitive and can prevent the system from returning to center while driving.

- b) **Notchy feeling or bump every ½ or ¼ turn** – This usually indicates a binding condition at the intermediate steering shaft u-joints. Verify that the steering shafts do not extend into the open area of u-joint, causing it to bind.
 - c) **Gradual increase in resistance** - The rack tube may be slightly bent due to bracket misalignment. This must be corrected before proceeding.
 - d) **Light variations in tension** – This is very common and will smooth out once the internal guide bushings have developed wear patterns (approx. 1,000 miles); similar to piston rings seating within a cylinder.
28. Continue by tightening the passenger-side outer clamp to 13-15 lb-ft., and check for binding.
- a) **Tightness near full-left lock (manual rack) or center of travel (power rack)** indicates that the passenger-side clamp has created one of the following issues.
 - The clamp is too tight and needs to be loosened slightly.
 - The clamp is not square to the bracket-side clamp. Check by measuring the gap at the opposite ends of the clamp.
 - There is debris, a burr, or other imperfection on the clamp or rack tube that must be removed.
 - b) Recheck for binding.
29. Tighten the two inner clamps to 13-15 lb-ft., and check for binding.
- a) **Tightness near full-left lock (manual rack) or center of travel (power rack)** indicates that the passenger-side clamp has created one of the following issues.
 - The clamp is too tight and needs to be loosened slightly.
 - The clamp is not square to the bracket-side clamp. Check by measuring the gap at the opposite ends of the clamp.
 - There is debris, a burr, or other imperfection on the clamp or rack tube that must be removed.
 - b) Recheck for binding.

Tie-Rod Installation

30. Verify that the rack has full travel.
- a) Turn the steering wheel to full left lock.
 - b) From one of the frame rails, measure the distance that the center link travels from full left to full right lock. The rack should travel 6-3/8".
 - If travel is less than 6-3/8", look for binding at the u-joints or with exhaust headers that may be limiting travel.
31. Center the rack.
- a) From full right lock, move the center link 3-3/16" toward the left. This is the rack and pinion's center of travel.
32. Tie-rod assemblies can now be installed as described in their respective installation guides (7903-TIER-XX).
- a) Installation of inner tie rod requires use of vehicle specific tie-rod adapter packaged with rack and pinion.
33. Adjusting the tie-rods to correctly set the alignment toe must be done with the suspension fully weighted and the rack and pinion at its center of travel.
34. Recheck all hardware for each portion of the steering system (aftermarket and OEM) to ensure it has been tightened to the proper torque specification.

ALIGNMENT

The rack & pinion must be professionally aligned after installation has been completed. Prior to setting "Toe," the rack & pinion must be at its center of travel. Our recommended alignment specs are to serve as a starting point for your particular application. Installed components, driver preference and specific application will have a great affect on the chosen settings for your vehicle.

	Street Performance	Road Course	Drag Strip
Caster	3-1/2° to 4° pos.	3-1/2° to 4° pos.	4° to 6° pos.
Camber	0° to 1/2° neg.	1-1/2° to 2° neg.	0°
Toe (total)	1/16" to 1/8" IN	1/16" OUT to 1/16" IN	1/16" to 1/8" IN

IMPORTANT: Notify the alignment technician of the following information.

Some applications must slightly offset the rack's travel to gain clearance between the passenger-side tie-rod assembly and the end of the rack and pinion. This condition can be identified by turning the steering to full right lock and moving the suspension through its range of travel. If the tie-rod contacts the rack, the passenger-side tie-rod assembly must be lengthened until there is 1/8" clearance. Usually one to two full turns of the adjuster will be enough, which only increases the tie-rod length less than 1/10 of an inch. The overall toe will then be set using the driver-side tie-rod assembly. If your alignment has already been set, the driver-side tie-rod assembly must be shortened by an equal amount. The steering wheel will need to be centered to match the alignment.

POST INSTALLATION INFORMATION

1000 Mile Break-In Period

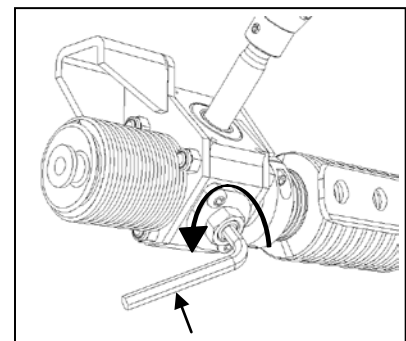
Internal guide bushings will develop wear patterns and reduce friction in the steering system. After approximately one-thousand street-driven miles you will notice slight reduction in steering effort and improvement to the steering systems ability to return to center after a turn.

Return to Center

If the return to center does not improve after the initial break in period, loosening the gear lash adjustment or adding positive caster will help.

Gear Lash Adjustment

After the initial break-in period (roughly 1000 miles) you may begin to notice a small amount of 'play' or slack at the steering wheel and then again every 3-5 years depending upon level of use. The bottom of the blue anodized pinion housing has a large jam nut surrounding an allen set screw. This set screw is the adjustment for gear lash between the 'rack' and 'pinion' gears. Loosen the jam nut then tighten the setscrew about 1/16th of a turn. Tighten the jam nut while holding the setscrew in its position. If there is still 'play' at the wheel, repeat the above steps. If the steering begins to feel 'notchy' or too sensitive while driving, you will need to loosen the setscrew.



Steering Assist Issues

If you notice any of the following symptoms, after you have verified that the alignment settings and tire pressures are correct, it may be necessary to adjust the steering bias. Each of these symptoms can be caused by a loose or misadjusted bias setting. Refer to “Adjusting Steering Bias” section for adjustment instructions.

- **Steering effort is extremely light**, such that the steering wheel can be turned with your smallest finger while the car is on the ground.
- **Steering assist is erratic**, possibly darting, pulling to either side, or hydraulic assist comes in and out.
- **Uneven steering effort**. Steering will feel heavier in one direction than the other.

MAINTENANCE

Regular Inspection

As with any of your vehicle's key components, the rack and pinion unit and additional steering components should be inspected on a regular basis. It is a good habit to check for loose mounting hardware or worn components, such as tie rods and ball joints, at every oil change or tire rotation. Because of the age of these vehicles we strongly suggest monitoring the structural integrity of the sheet metal and welds at high stress areas of the chassis. These include, but are not limited to, shock towers; lower arm mounting points; strut rod mounting points; leaf spring mounts; rear shock mounts.

ONLINE INFORMATION

Technical Support

Additional resources for trouble-shooting and correcting possible issues are available in the technical support section of our website or by emailing our tech support staff.

www.totalcontrolproducts.com/tech

tcptech@cachassisworks.com

Document Library

Complete documentation including installation instructions for all kit components and technical data sheets can be accessed through our online document library.

www.totalcontrolproducts.com/docs

NOTES:

WARRANTY NOTICE:

There are **NO WARRANTIES**, either expressed or implied. Neither the seller nor manufacturer will be liable for any loss, damage or injury, 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. **ALL 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. **NO PRODUCT OR SERVICE IS DESIGNED OR INTENDED TO PREVENT INJURY OR DEATH.**

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