

READ ALL INSTRUCTIONS COMPLETELY AND THOROUGHLY UNDERSTAND THEM BEFORE DOING ANYTHING.  
CALL TOTAL CONTROL PRODUCTS TECH SUPPORT (916) 388-0288 IF YOU NEED ASSISTANCE.

# INSTALLATION GUIDE



## TCP FASS5D2 Front Air-Spring Suspension 1967 Mustang and Cougar



Part Number	Description	PDF Page
TCP COLVF-14	Tower Adapter for VariShock Ball Stud Mount	2
TCP EE-01	Eccentric Eliminators	6
TCP LCA-05-SVH	Lower Control Arms	8
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VAS 132MS-350	VariShock QS2 Double-Adjustable Air-Spring Shocks	32

**Instructions included for components listed in chart.**

# INSTALLATION GUIDE



## TCP COLVF-14

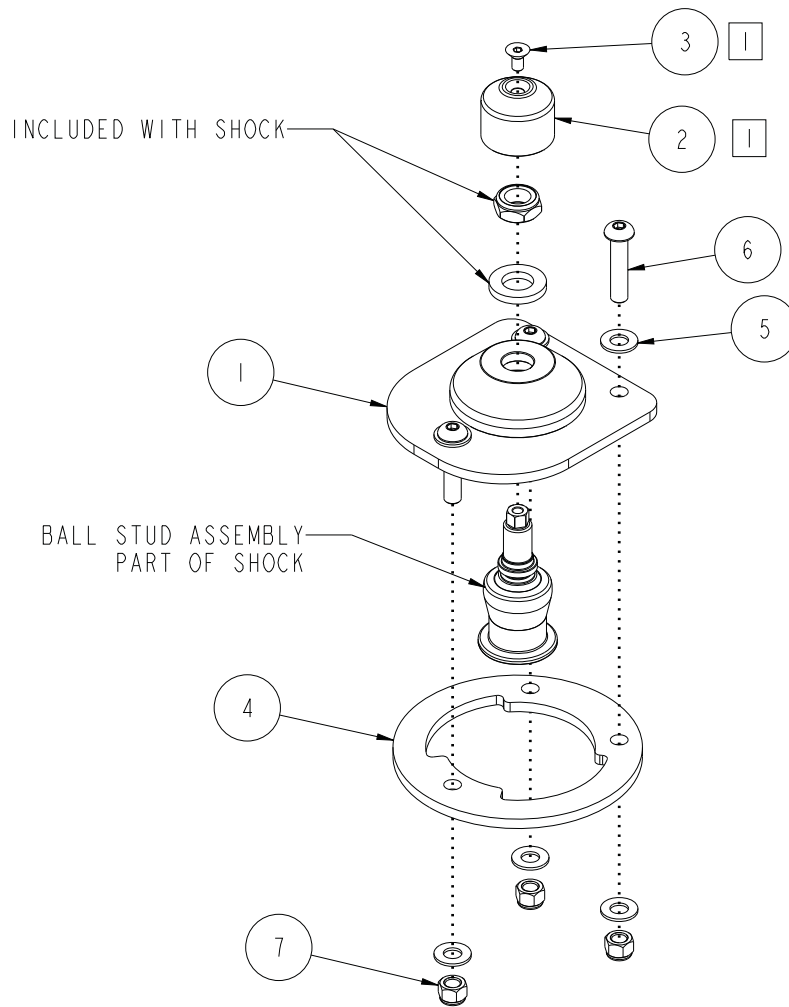
### 1"-Offset Shock Tower Adapter



**Description:** Adapter plate mounts to factory shock tower to allow bolt-on use of stem-style upper mount of TCP Bolt-In Coil-Over or ShockWave™ front suspension. Includes 1"-offset shock tower adapter plate, backup plate, and mounting hardware.

**Applications:** Comet '60-67 and '71-77, Cougar '67-73, Cyclone '64-71, Fairlane '66-71, Falcon '60-70, Maverick '70-77, Montego '68-71, Mustang '64-73, Ranchero '60-71, Torino '68-71

ITEM	QTY	PART NO.	DESCRIPTION
1	2	7909-059	TOWER ADAPTER WELDMNT, 1.00 OFFSET, 60-73 FORD/MERCURY
2	2	7909-055	CAP, TOWER ADAPTER, POLISHED STAINLESS
3	2	3105-025F0.50-H	FLAT HEAD SOCKET SCREW, 1/4-28 x 1/2, STAINLESS STEEL, POLISHED
4	2	7909-032	SHOCK TOWER BACKUP PLATE EARLY STYLE
5	12	3120-038S-Y	FLAT WASHER, 3/8 SAE, HARDENED
6	6	3104-038C1.75C	BUTTON HEAD CAP SCREW, 3/8-16 x 1 3/4, CLEAR ZINC
7	6	3101-038-16C	LOCKNUT 3/8-16, GRADE 5, NYLON INSERT, CLEAR ZINC



NOTES:

1 NOT INCLUDED IN THIS PART NUMBER. PART OF TCP COLVF-12

DESCRIPTION

**TOWER ADAPTER, 1.0 OFFSET,  
BALL STUD MNT, 60-73 FORD/MERCURY**

*Chris Alston's* **CHASSISWORKS INC.**  
8661 YOUNGER CREEK DRIVE  
SACRAMENTO, CA 95828  
(916) 388-0288 FAX 388-0295

PART NO.

**TCP COLVF-14**

8/20/10

DWG: 7903-TCP\_COLVF-14

# PARTS LIST

Qty	Part Number	Description
2	7909-032	Shock Tower Backup Plate
2	7909-059	Shock Tower Adapter, 1" Offset

7918-063 Hardware Bag

Qty	Part Number	Description
6	3101-038-16C	Locknut 3/8-16 Nylon Insert Clear Zinc
6	3104-038C1.75C	Button Head 3/8-16 x 1-3/4" Cap Screw Clear Zinc
2	3109-063-S-2-Y	Aircraft Washer 5/8", Small OD
12	3120-038S-Y	Washer 3/8" Hardened Flat SAE Yellow Zinc
1	7909-051	Spot-Weld Removal Drill Bit 3/8"

## INSTRUCTIONS

Removal of factory shocks, springs, and upper shock mount should be complete before proceeding. Specific instructions are provided in the installation guide packaged with your VariShock coil-over (VAS 16XMS-425) or ShockWave air suspension (VAS 13XMS-350).

*Do not install springs onto coil-over shocks or inflate air spring until after suspension has been checked for adequate travel clearance.*

### Chassis Inspection

With factory components out of the way, this is a good time to inspect sheet metal for signs of fatigue. Clean the area to remove any grease or dirt so metal and welds are clearly visible. Look for cracks along welds or tearing of mounts in any way. If there is any damage present, repairs will have to be made before proceeding.

### Installation

1. Remove OEM coil spring isolator; positioned on upper spring seat of shock tower.

*Step 2 and Figure 3-1 describe removing the upper spring seat and apply only to vehicles with carriage bolts at the upper shock mounts. (Includes '67-73 Mustang, '66-71 Fairlanes, and others.) Hex-bolt equipped vehicles ('65-66 Mustang and others) have upper spring seats that seat flat against the bottom-side of the shock tower. They do not require removal and may skip to Step 3 of these instructions.*

2. Using the supplied bit, drill out the three spot welds securing the upper spring seat to the shock tower (Figure 3-1). Once you have drilled through the spring seat material, use a pry bar to break the remaining bit of material. Any remaining material must be ground flush and painted.
3. Position the tower adapter on top of the shock tower (large radiused edge closest to engine) and the backup plate underneath to sandwich the factory sheet metal. Use the three button-head bolts, flat washers, and locknuts supplied to secure the mount and backup plate. Refer to page 2 for illustration.



Figure 3-1 applies only to vehicles using carriage bolts to secure the factory upper shock mount.

Note: Fairlane shock towers use a slightly different bolt pattern and must be drilled to match the adapter and backup plates. Structural integrity is maintained through use of the backup plate.

4. Insert the stem of the shock pivot stud into the tower adapter mount hole from underneath.

5. Place the thicker stem washer over the shock pivot stud, followed by the 5/8"-OD aircraft washer, and finally the 5/8-18 half locknut supplied with your VariShock coil-over.
6. Tighten the stem hardware, holding the locknut with a 15/16" open-end wrench and turning the pivot stud counter-clockwise with a 7/16" deep-well socket. Torque to 45-50 lb/ft.
7. The zerk fitting can now be installed to grease the pivot-stud. If installing optional shock tower adapter cap (TCP COLVF-12), remove zerk fitting after pivot stud has been greased.

**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 products. 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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7903-EE-01

REV 01/18/05

## INSTALLATION GUIDE



## Eccentric Eliminator

For '66 – Early '70s Fords  
with OEM eccentric method camber adjustment

**P/N: TCP EE-01**

### DESCRIPTION:

ECCENTRIC ELIMINATOR PLATES AND HARDWARE FOR LOWER CONTROL ARMS 1.70 x 1.70 WITH 1/2 HOLES x 3"; PROVIDES 11 OFFSET COMBINATIONS

### APPLICATIONS:

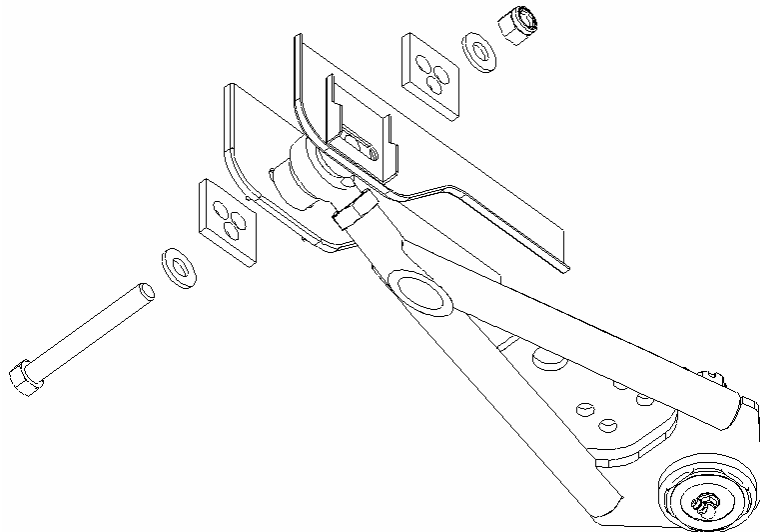
FITS '66 – EARLY '70S FORDS WITH OEM ECCENTRIC CAMBER ADJUSTMENT AND 1/2" LOWER CONTROL ARM MOUNTING BOLTS

## PARTS LIST

Part Number	Description	Qty
3100-050C4.50Y	Bolt 1/2-13 x 4-1/2" Hex Head Cap Screw	2
3101-050-13C	Locknut 1/2-13 Nylon Insert	2
3120-050S-Y	Washer 1/2 Flat SAE .531 x 1.062 x .095	4
7900-092	Eccentric Eliminator Plate	4

## INFORMATION

- Our Eccentric Eliminators' three-hole design provides 11 different mounting positions for the lower control arm, with a total camber adjustment range of 5 degrees.
- Each position is equal to roughly 1/2 degree of movement.
- The bolt must pass through the same hole of the fore and aft eliminator plates.
- The eliminator plates must have matching orientation.
- Negative camber will need to be initially set toward the negative side of the intended adjustment spec.
  - Example: Desired -1.5°, Initial Setting -2°
- TCP adjustable upper control arms or adjustment shims will be needed to make precise alignment settings.
- Torque 1/2" lower control arm bolts to 65 lb.ft.



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# INSTALLATION GUIDE



## TCP LCA-05 Lower Control Arms



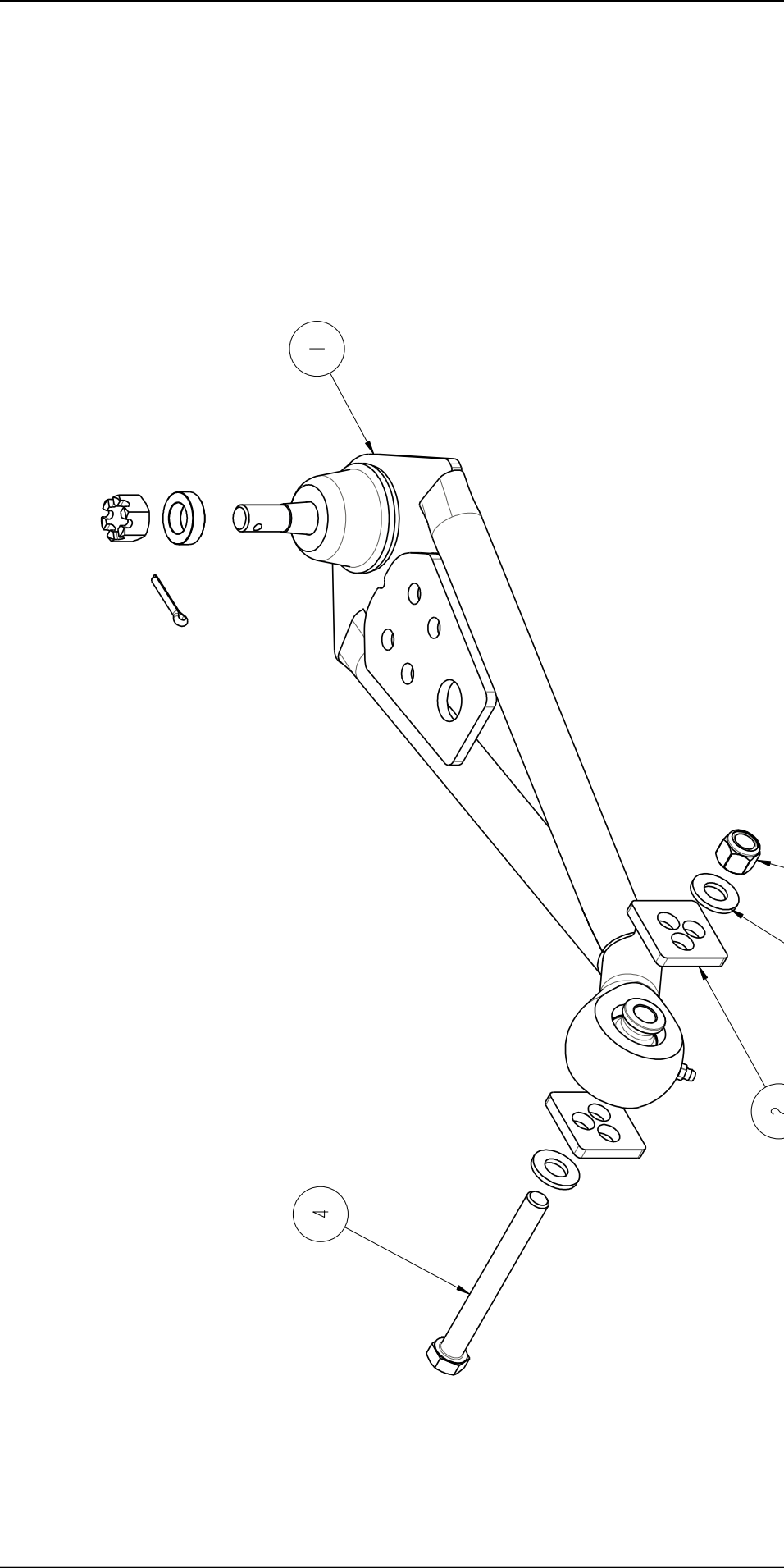
**Description:** Direct replacement lower control arms for use with OEM or TCP strut rods.

**Applications:** Comet '66-67, Cougar '67, Cyclone '66-67, Fairlane '66-67, Falcon '66-67, Mustang '67, Ranchero '66-67

**Note:** Must upgrade to V8 spindle.

FITS:  
 COMET 66-67  
 COUGAR 67  
 CYCLONE 66-67  
 FAIRLANE 66-67  
 FALCON 66-67  
 MUSTANG 67  
 RANCHERO 66-67

ITEM	QTY	PART NO.	DESCRIPTION
1	1	7904-074	CONTROL ARM ASSEMBLY LOWER 15 3/4, 4-HOLE, 2nd DESIGN
2	2	7900-092	ECCENTRIC ELIMINATOR PLATE
3	2	3120-050S-Y	FLAT WASHER, 1/2 SAE, HARDENED
4	1	3100-050C4.50Y	HEX BOLT, GRADE 8 1/2-13 x 4 1/2
5	1	3101-050-13C	LOCKNUT 1/2-13 NYLON INSERT PLATED



DESCRIPTION  
**TCP LCA 15-3/4" 4-HOLE  
 MUSTANG 67**

PART NO.  
**TCP LCA-05**

*Chris Alston's CHASSISWORKS INC.*  
 8661 YOUNGER CREEK DRIVE  
 SACRAMENTO, CA 95828  
 (916) 388-0288 FAX 388-0295

7/22/05 DWG: 7903-LCA-05

# PARTS LIST

## TCP LCA-05-SVH - Lower Control Arms, 15.75" 4-Hole

Qty	Part Number	Description
2	7904-074-SVH	Lower control arm assembly, 15.75"
1	7918-020	Hardware bag

## 7918-020 - Hardware Bag

Qty	Part Number	Description
2	3100-050C4.50Y	Bolt 1/2-13 x 4-1/2" hex head cap screw
2	3101-050-13C	Locknut 1/2-13, nylon lock, plated
2	3120-050S-Y	Washer 1/2" flat SAE, hardened

# INSTRUCTIONS

*NOTE: A 1965 Mustang was used for the following images and may show slight differences from the later Mustang suspension. The installation procedure is identical.*

## Remove OEM Components

1. Raise the front end of the car and secure with jack stands. Wheels must not be in contact with the ground.
2. Remove wheels, making note of which side of vehicle they were removed from.
3. Unbolt the anti-roll bar from the lower control arm.
4. Remove the cotter pin and castle nut from the lower-balljoint stud.
5. Using a pickle fork or similar tool, separate the lower balljoint from the spindle. A large hammer can also be used to strike upright near balljoint and unseat the balljoint stud.
6. Unbolt the strut rod from the lower control arm.



7. Unbolt the lower control arm from the frame mounting point.

### Chassis Inspection

8. Clean the area to remove any grease or dirt so the metal and welds are clearly visible.
9. Look for cracks along the welds or tearing of the mounts in any way. If there is any damage present, repairs will have to be made before proceeding.



10. Install the TCP lower arm and secure using the 1/2" bolt and flat washer. The bolt should be inserted from the front side of the control arm mount.



*The eccentric eliminator TCP EE-02 should be installed with the lower control arms.*



11. Tighten hardware to 65 lb-ft.



12. Loosely bolt the strut rod to lower control arm using the socket-head screws, flat washers, and locknuts.



13. Remove cotter pin, castle nut, and spacer from balljoint stud, and then insert balljoint stud into tapered seat of the spindle. The stud should seat firmly with no looseness or rocking.
14. Place the spacer over the stud followed by the castle nut.



15. Tighten the castle nut to 60 lb-ft., and check the alignment with the cotter pin hole. Tighten the castle nut until the cotter pin can be inserted through the slots and the hole in the ball joint stud. Do not exceed 75 lb-ft.

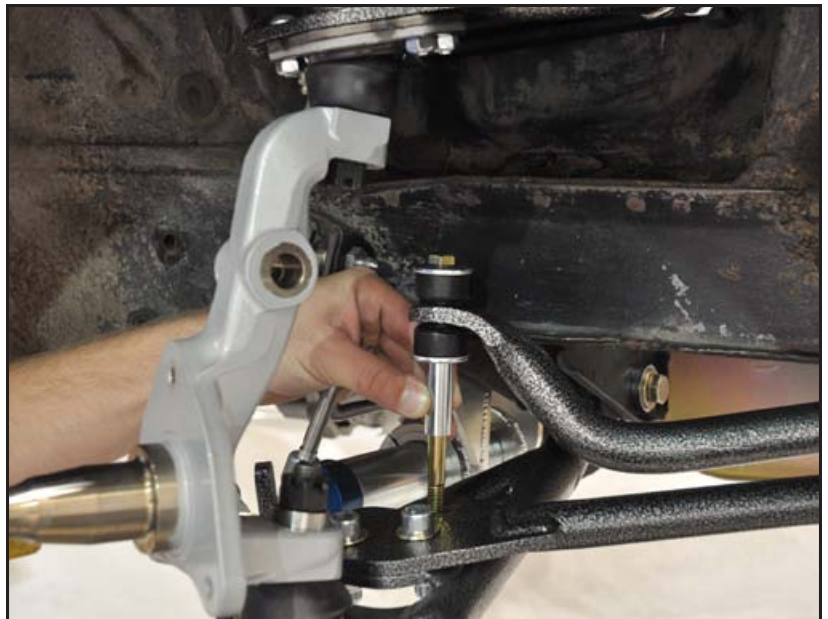
**DO NOT LOOSEN THE CASTLE NUT TO ALIGN THE COTTER PIN.**



16. Insert the cotter pin and bend the ends over flat against the threads.
17. If using TCP adjustable strut rod, see strut rod installation guide for information regarding initial adjustment.
18. Once the strut rod length has been adjusted, the socket head screws can be torqued to 60 lb-ft.



19. Install the anti-roll-bar end-link assembly.
20. Check all mounting hardware.



# Torque Specifications

Fastener Description	Location	Torque Value
Hex Head Cap Screw, 1/2-13 x 4-1/2	Pivot Assembly to Frame Mount	65 lb-ft.
Lower Balljoint Castle Nut	Balljoint to Lower Spindle	60-75 lb-ft.
Hex Head Cap Screw, 7/16-14 x 1-1/2	Strut Rod Adapter Plate to Lower Control Arm	60 lb-ft.

## Alignment

***The vehicle must be professionally inspected and aligned prior to regular use.***

If a trailer is not available, your alignment will need to be somewhat close to final specs in order to safely drive your vehicle to the alignment shop. Visually determine if the front wheels look straight. They should not appear to “toe” (left to right) -in or -out. The outside of the wheels should be very close to vertical. A few degrees of negative camber (leaning in) is acceptable.

	Street Performance		Road Course		Drag Strip	
	Manual	Power	Manual	Power	Manual	Power
Caster	2-1/2° to 3° pos.	3-1/2° to 4° pos.	2-1/2° to 3° pos	3-1/2° to 4° pos	4° to 6° pos	4° to 6° pos
Camber	0° to 1/2° neg	0° to 1/2° neg	1-1/2° to 2° neg	1-1/2° to 2° neg	0°	0°
Toe (total)	1/16” to 1/8” in	1/16” to 1/8” in	1/16” out to 1/16” in	1/16” out to 1/16” in	1/16” to 1/8” in	1/16” to 1/8” in

Our recommended alignment specs serve as a starting point for your particular application. Installed components, driver preference, and specific application will have a great affect on the correct settings for your vehicle.

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# INSTALLATION GUIDE



## TCP STRD-06 Adjustable Strut Rods



**Description:** Direct replacement strut rods for use with OEM or TCP lower control arms.

**Applications:** Comet '66-67, Cougar '67, Cyclone '66-67, Fairlane '66-67, Falcon '66-67, Mustang '67, Ranchero '66-67

**Note:** Must upgrade to V8 spindle

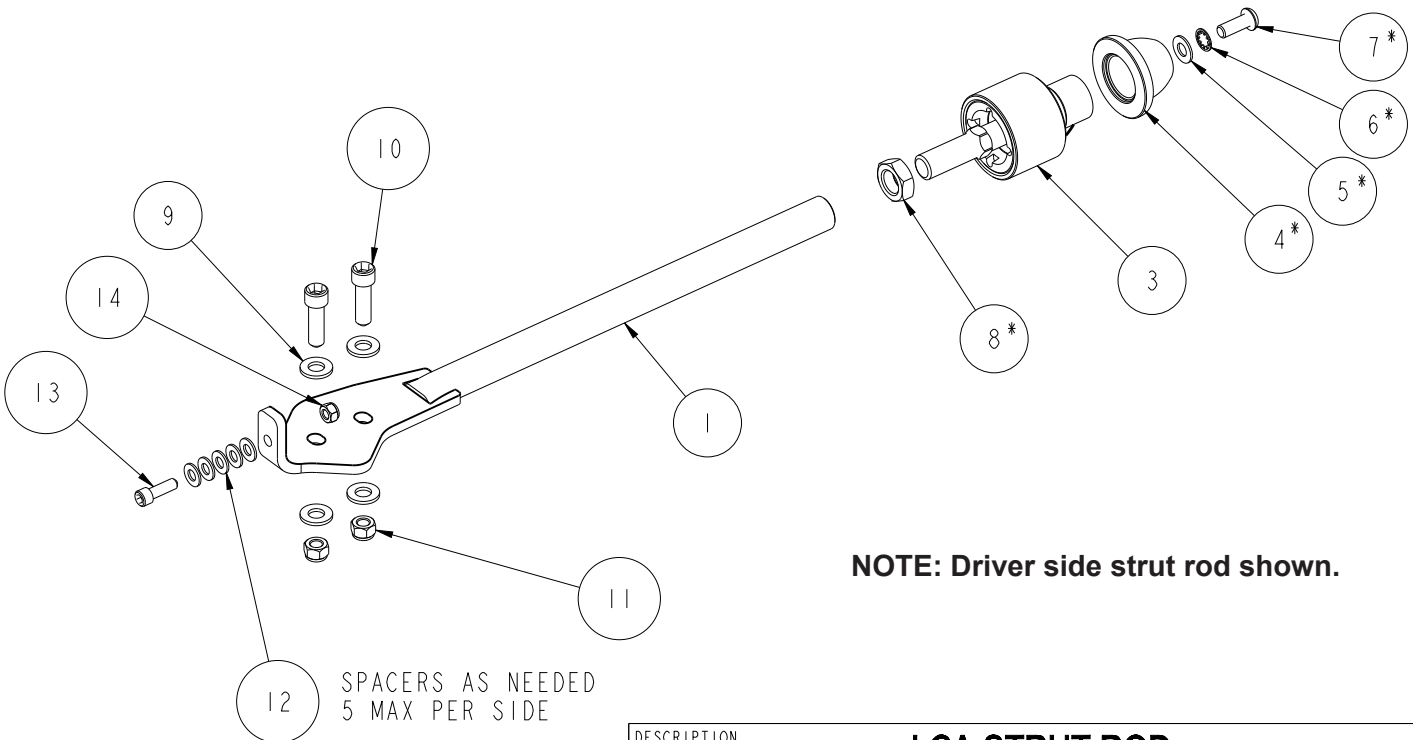
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ITEM	QTY	PART NO.	DESCRIPTION
1	1	7906-045	STRUT ROD CONTROL ARM ADAPTER 03 WELDMNT, 2nd DESIGN
2	1	7906-046	STRUT ROD CONTROL ARM ADAPTER 04 WELDMNT, 2nd DESIGN
3	2	7906-062	PIVOT HOUSING ASSY, Ø1.45 MOUNT STRUT PIVOT, MUSTANG
4	1	7906-058	BACKUP NUT STRUT PIVOT, MUSTANG
5	1	3157-038S-S	WASHER, 3/8 SAE, STAINLESS, .812 OD x .406 ID x 1/16 THICK
6	1	3108-0381-S	INTERNAL TOOTH LOCK WASHER, 3/8 STAINLESS 410
7	1	3104-038F1.00C	BUTTON HEAD CAP SCREW, 3/8-24 x 1, CLEAR ZINC
8	1	3102-075-16RC	JAM NUT, 3/4-16 RIGHT, CLEAR ZINC
9	8	3120-044S-Y	FLAT WASHER, 7/16 SAE, HARDENED
10	4	3103-044C1.50C	SOCKET HEAD CAP SCREW, 7/16-14 x 1 1/2, CLEAR ZINC
11	4	3101-044-14C	LOCKNUT 7/16-14, GRADE 5 NYLON INSERT, CLEAR ZINC
12	10	3157-031S-C	WASHER, 5/16 SAE, ZINC PLATED, 11/32 ID x 7/8 OD x 1/16 THICK
13	2	3103-031C1.00C	SOCKET HEAD CAP SCREW, 5/16-18 x 1, CLEAR ZINC
14	2	3101-031-18C	LOCKNUT 5/16-18, GRADE 5, NYLON INSERT, CLEAR ZINC



**NOTE: Driver side strut rod shown.**

\* PART OF 7906-062

DESCRIPTION		<b>LCA STRUT ROD 20 1/16 INLINE</b>	
<i>Chris Alston's CHASSISWORKS INC.</i> 8661 YOUNGER CREEK DRIVE SACRAMENTO, CA 95828 (916) 388-0288 FAX 388-0295		PART NO. <b>TCP STRD-06</b>	
		8/26/10	DWG: 7903-STRD-06

# PARTS LIST

## TCP STRD-06-SVH - Strut Rod 20- 1/16" OAL

Qty	Part Number	Description
1	7906-045-SVH	Strut rod weldment driver side
1	7906-046-SVH	Strut rod weldment passenger side
2	7906-062	Strut pivot mount 1.45" mount bore
1	7918-002	Hardware bag

## 7918-002 - Hardware Bag

Qty	Part Number	Description
2	3101-031-18C	Locknut 5/16-18 nylon insert
4	3101-044-14C	Locknut 7/16-14 nylon insert
2	3103-031C1.00C	Socket head 5/16-18 x 1" socket head cap screw
4	3103-044C1.50C	Socket head 7/16-14 x 1-1/2" socket head cap screw
8	3120-044S-Y	Washer 7/16" flat SAE, hardened
10	3157-031S-C	Washer 5/16" flat SAE

# INSTRUCTIONS

*NOTE: A 1965 Mustang was used for the following images and may show slight differences from the later Mustang suspension. The installation procedure is identical.*

## Remove OEM Components

1. Raise front end of car and secure with jack stands.
2. Wheels must not be in contact with ground.
3. Remove wheels, making note of which side of vehicle they were removed from.
4. Remove the two bolts and nuts that attach the factory strut rod to the lower control arm.
5. Remove the large nut on the forward side of the strut-rod frame mount that retains the rubber bushing.
6. Remove the factory strut rod from vehicle.
7. Discard factory hardware and parts.

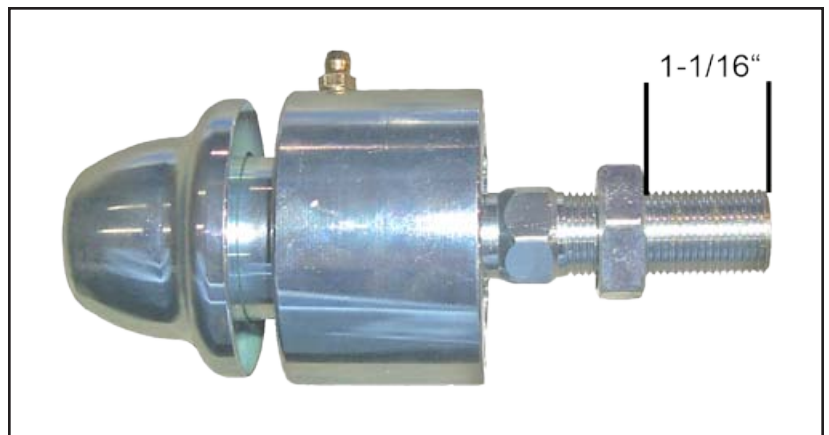


8. Remove the steel sleeve from the frame mount with a chisel. This may not on all vehicles.
9. With the strut rod out of the way, inspect sheet metal for signs of fatigue.

Clean the area to remove any grease or dirt so metal and welds are clearly visible. Look for cracks along welds and/or tearing of the mounts in any way. If there is any damage present, repairs must be made before proceeding.



10. Thread the 3/4-16 RH jam nut onto the stud of the pivot assembly 1-1/16”.



11. Apply anti-seize to threads on the pivot stud.



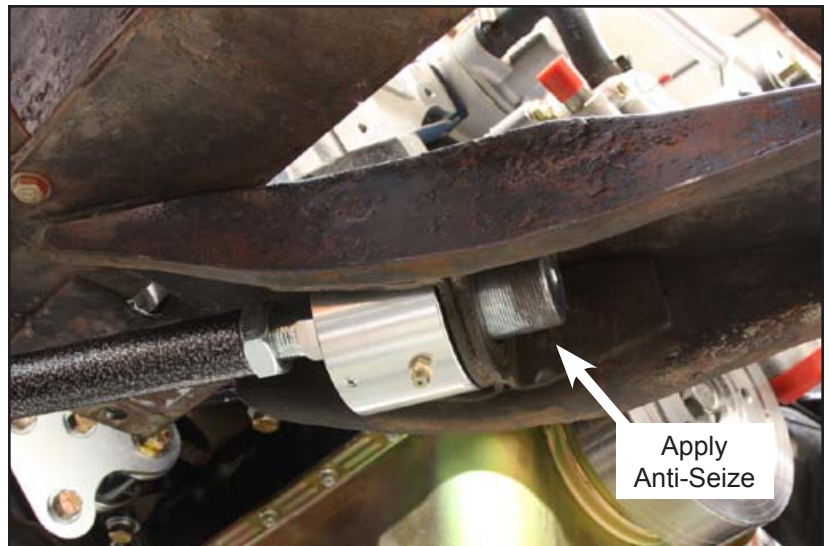
12. Screw pivot assembly into strut rod.



13. Remove button-head screw and backup nut from the pivot assembly.



14. Rest the strut rod plate on top of the lower control arm before inserting the pivot housing into the factory frame mount.
15. Rotate the pivot housing so that the zerk fitting is pointing down and can be easily accessed with a grease gun.
16. Apply anti-seize onto the threads and the screw the backup nut onto the pivot housing.



17. Tighten the backup nut using a 1/2"-drive ratchet; torque to 150 lb-ft.

***Do not use an impact gun .***



18. Apply Loctite™ threadlocker to the 3/8" button-head screw, and then install with a flat washer and lock washer.
19. Tighten the button head to 30 lb-ft.



20. Loosely bolt the strut-rod plate to the lower control arm using hardware shown.
21. The adapter plate steering stop must be pointing up.



22. Using the pivot stud hex, adjust the length of strut rod to position lower control arm square to frame rail.



23. Once adjustment is complete, tighten the jam nut against the strut rod. Hold the pivot stud hex with a wrench to prevent from adjusting the strut rod length.



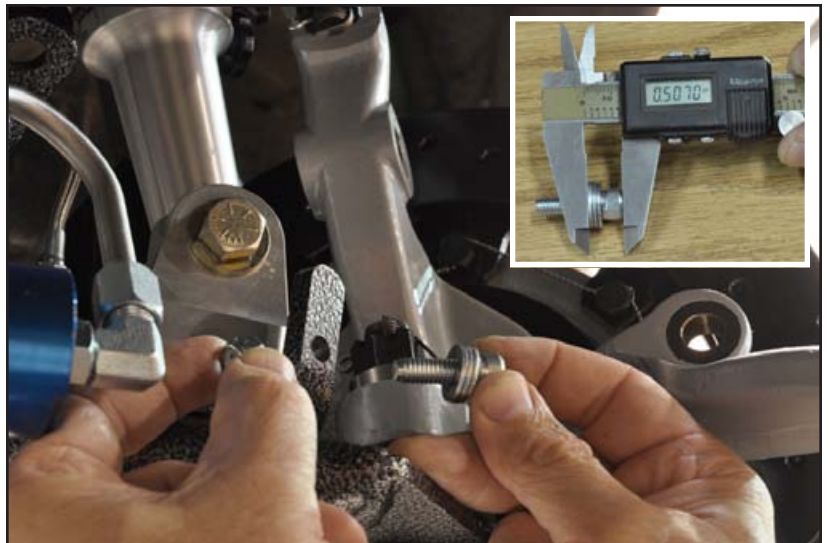
24. Tighten the socket-head cap screws to 60 lb-ft.  
25. Grease the pivot assemblies using a standard grease gun.



### Steering Stop Installation

Due to variations in chassis and common spindle swaps we have included an adjustable hardware stop to limit steering travel, preventing the tie-rod assemblies from contacting the rack body..

26. With the suspension at ride height turn the steering to full lock.  
27. Measure the distance from the strut-rod tab to the flat contact area of the steering arm.  
28. Place as many flat washers as needed onto the bolt to be slightly thicker than the measured distance (including the socket head of the bolt).



29. Thread the locknut onto the bolt and tighten to 25 lb-ft.
30. With the steering at full lock, verify there is clearance between all components as the suspension is moved throughout its range of travel. Add washers to the stop, if needed.
31. Install wheels to their original position and torque lug nuts.



## Torque Specifications

Fastener Description	Location	Torque Value
Backup Nut, 1/2 drive (Item 3)	Strut Rod Frame Mount	150 ft lbs
Button Head Cap Screw, 3/8-24 x 1	Backup Nut (Jam Bolt)	30 ft lbs
Jam Nut, 3/4-16	Pivot Assembly to Strut Rod	80 ft lbs
Hex Head Cap Screw, 7/16-14 x 1-1/2	Strut Rod Adapter Plate to Lower Control Arm	60 ft lbs

## Alignment

***The vehicle must be professionally inspected and aligned prior to regular use.***

If a trailer is not available, your alignment will need to be somewhat close to final specs in order to safely drive your vehicle to the alignment shop. Visually determine if the front wheels look straight. They should not appear to “toe” (left to right) -in or -out. The outside of the wheels should be very close to vertical. A few degrees of negative camber (leaning in) is acceptable.

	Street Performance		Road Course		Drag Strip	
	Manual	Power	Manual	Power	Manual	Power
Caster	2-1/2° to 3° pos.	3-1/2° to 4° pos.	2-1/2° to 3° pos	3-1/2° to 4° pos	4° to 6° pos	4° to 6° pos
Camber	0° to 1/2° neg	0° to 1/2° neg	1-1/2° to 2° neg	1-1/2° to 2° neg	0°	0°
Toe (total)	1/16” to 1/8” in	1/16” to 1/8” in	1/16” out to 1/16” in	1/16” out to 1/16” in	1/16” to 1/8” in	1/16” to 1/8” in

Our recommended alignment specs serve as a starting point for your particular application. Installed components, driver preference, and specific application will have a great affect on the correct settings for your vehicle.

**READ ALL INSTRUCTIONS COMPLETELY AND THOROUGHLY UNDERSTAND THEM BEFORE DOING ANYTHING.  
CALL TOTAL CONTROL PRODUCTS TECH SUPPORT (916) 388-0288 IF YOU NEED ASSISTANCE.**

# INSTALLATION GUIDE



## **TCP UCA-07 Coil-Spring Upper Control Arm with Dropped Pivot Shaft 1967-73 Mustang**

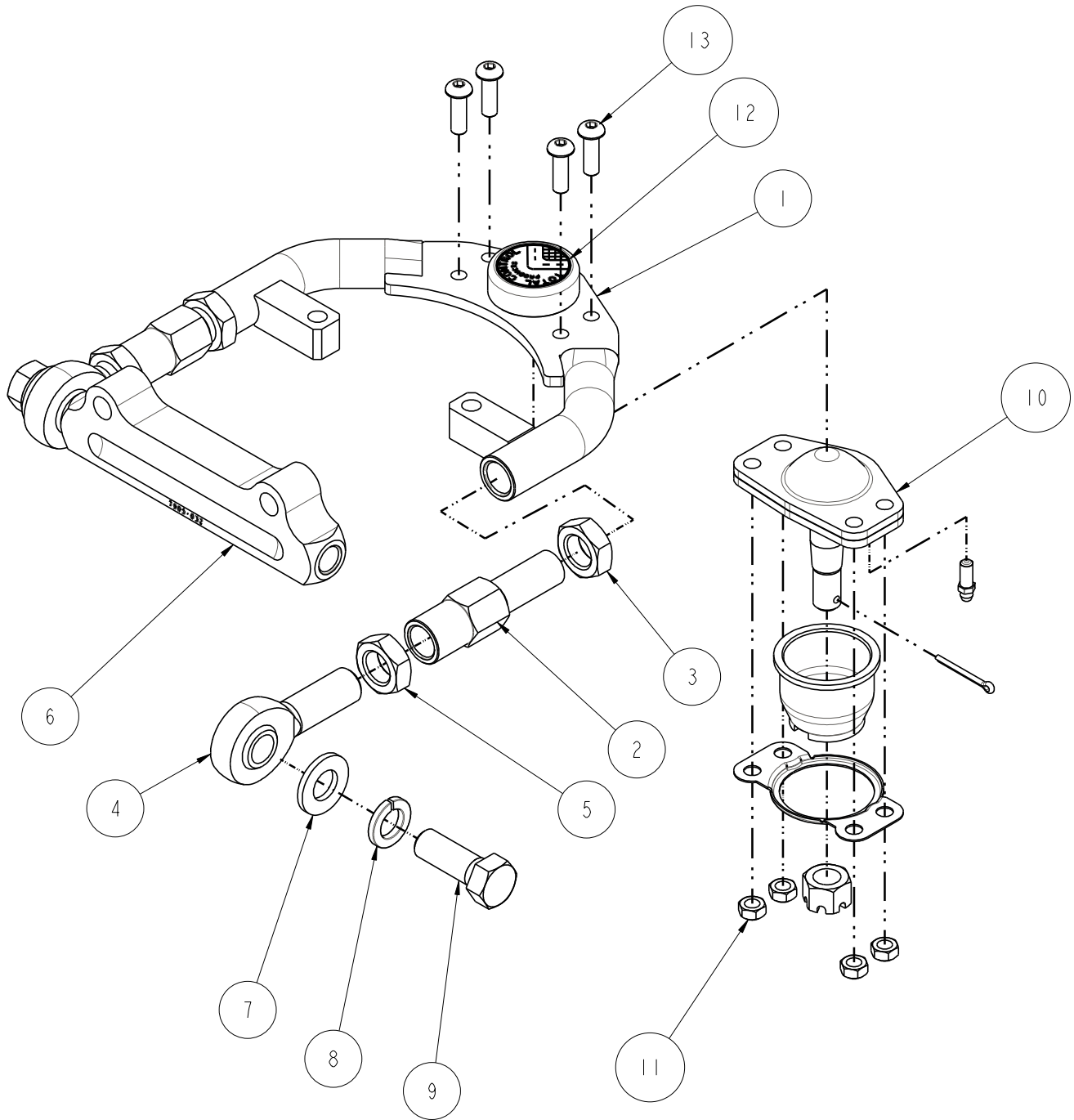


**Description:** Adjustable length upper control arm for 4.75" bolt pattern with offset pivot shaft for camber gain improvement. For use with OEM replacement spring perch.

**Applications:** Comet '66-77, Cougar '67-73, Cyclone '66-71, Fairlane '66-71, Falcon '66-70, Maverick '70-77, Montego '68-71, Mustang '67-73, Ranchero '66-71, Torino '68-71

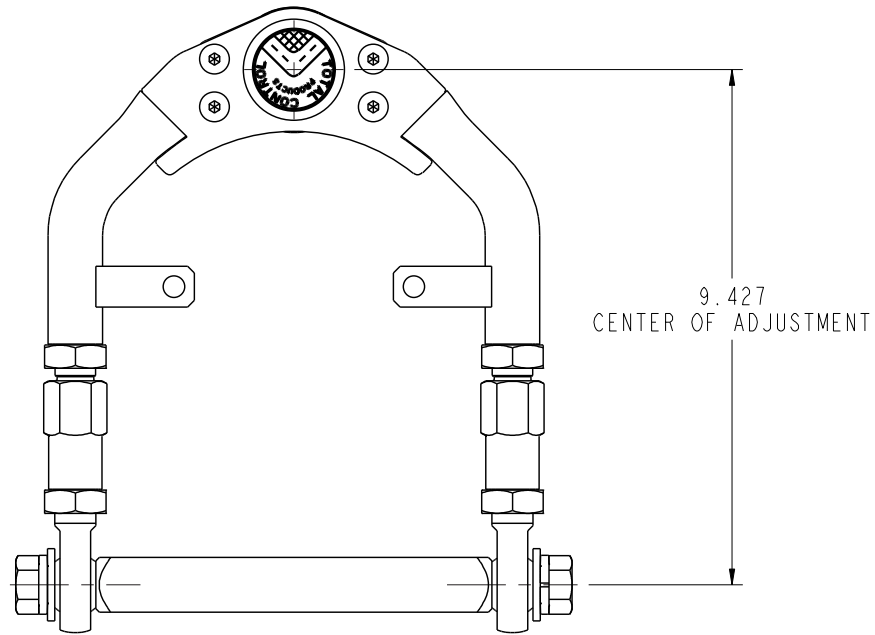
**IMPORTANT:** The outer shock tower reinforcement plate and suspension bump stop must be reinstalled prior to operating the vehicle. Worn or damaged suspension bump stops must be replaced. Failure to provide a proper compression-travel suspension stop will cause unwarrantable damage to the shock absorber and possible structural damage to the chassis.

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DISCARD SCREW, NUT AND LOCK WASHER INCLUDED WITH BALLJOINT

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CHANGE BALLJOINT SCREW AND NUT	11/23/07	S. RIEGER



ITEM	QTY	PART NO.	DESCRIPTION
1	1	7905-015	UPPER ARM WELDMENT, TABS, TCP
2	2	7905-003	ADJUSTMENT COUPLER 3/4-16 RIGHT & LEFT
3	2	3102-075-16LY	JAM NUT, 3/4-16 LEFT, YELLOW ZINC
4	2	3112-075X063-R	ROD END 3/4 x 5/8 BORE, 4130 RIGHT, NYLON KMX12-10
5	2	3102-075-16RC	JAM NUT, 3/4-16 RIGHT, CLEAR ZINC
6	1	7905-032	PIVOT SHAFT, DROPPED 1", 4.75 SPACING, UPPER CONTROL ARM
7	2	3120-063S-Y	FLAT WASHER, 5/8 SAE, HARDENED
8	2	3108-063L-C	LOCK WASHER Ø5/8, SPRING
9	2	3100-063F1.75Y	BOLT, 5/8-18 x 1 3/4 HEX HEAD, GRADE 8
10	1	7905-023	BALL-JOINT KIT W/HARDWARE 4-BOLT STYLE 1964/1970 MUSTANG
11	4	3129-031-18C	5/16-18 HEX TOP LOCK NUT GRADE C (5) CLEAR ZINC
12	1	7903-DECAL-RI.5	DECAL, ROUND Ø1 1/2, TOTAL CONTROL PRODUCTS
13	4	3104-031CI.00C	BUTTON HEAD SOCKET CAP SCREW 5/16-18 x 1, CLEAR ZINC

UNLESS OTHERWISE SPECIFIED  DIMENSIONS ARE IN INCHES FRACTIONS TOLERANCES ±1/16 ±.05 ±.005 ANGLES ±.5 ±.01 ±.005 DECIMAL ±.1 ±.01 ±.0010	APPROVALS DRAWN BY: S. RIEGER CHECKED BY: S. RIEGER DWG RELEASE LEVEL: Released	DATE 9/21/07 11/7/07	DESCRIPTION <b>A-ARM ASSEMBLY, UPPER,          WITH TABS, 4.75 DROPPED MNT, MUSTANG</b>  Chris Alston's CHASSISWORKS INC. 8661 YOUNGER CREEK DRIVE SACRAMENTO, CA 95828 (916) 388-0288 FAX 388-0295
FINISH <b>NONE</b>  MATERIAL <b>ASSEMBLY</b>	SIZE <b>B</b>	PART NO. <b>7905-037</b>	PART REV. <b>1</b>
SCALE: 5:16		DWG: 7905-037 REV: 1	
SHEET 1 OF 1			

# PARTS LIST

## TCP UCA-07 - Coil-Spring Upper Control Arms, 4.75" Bolt Pattern

Qty	Part Number	Description
2	7905-027	UCA shim .10 x 4.75 spacing
2	7905-037	UCA assembly 4.75" with tabs, dropped shaft
1	7918-021	Hardware bag

## 7905-037 - Upper Control Arm Assembly

Qty	Part Number	Description
2	3100-063F1.75Y	Bolt 5/8-18 x 1-3/4" hex head cap screw
2	3102-075-16LY	Jam nut 3/4-16 LH, 1-1/8" hex x .42" tall
2	3102-075-16RC	Jam nut 3/4-16 RH, 1-1/8" hex x .42" tall
4	3104-031C1.00C	Button head 5/16-18 x 1" cap screw
2	3108-063L-C	Lock washer 5/8" regular
2	3112-075X063-R	Rod end RH 3/4"-thread x 5/8"-bore
2	3120-063S-Y	Washer 5/8" flat SAE, hardened
4	3129-031-18C	Top lock nut 5/16-18 all steel
2	7905-003	Coupler male-female 3/4-16 x 3/4-16 x 3-3/4" length
1	7905-015	Upper arm weldment with tabs
1	7905-023	Upper balljoint, 4-bolt
1	7905-032	Dropped pivot shaft, 1/2" holes, 4.75 apart

## 7918-021 - Hardware Bag

Qty	Part Number	Description
4	3100-038C1.75Y	Bolt 3/8-16 x 1-3/4" hex head cap screw
4	3100-050C2.50Y	Bolt 1/2-13 x 2-1/2" hex head cap screw
4	3101-038-16C	Locknut 3/8-16 nylon insert 9/16" hex x .45" tall
4	3108-050L-C	Lock washer 1/2" regular
8	3120-038S-Y	Washer 3/8 flat SAE, hardened
8	3120-050S-Y	Washer 1/2" flat SAE, hardened
4	3230	Nut 1/2-13 standard 3/4" hex x .44" Tall

# INSTRUCTIONS

1. Raise front end of car and secure with jack stands. Wheels must not be in contact with ground.
2. Remove wheels, making note of which side of vehicle they were removed from.
3. Unbolt lower shock mount from spring perch (Figure 5-1).
4. Unbolt upper shock mount from shock tower (Figure 5-2).  
If replacing the shock, unbolt shock from upper mount prior to unbolting mount.
5. Remove shock and mount from vehicle (Figure 5-3).



Figure 5-1



Figure 5-2



Figure 5-3

6. Using a spring compressor, remove the coil spring. Follow the tool manufacturer's instructions for proper use of the spring compressor.
7. Unbolt lower spring perch from control arm.
8. Secure lower control arm and spindle assembly. Place a jack stand under lower control arm. Keep spindle assembly in upright position to prevent damage to brake lines. Heavy wire or tie down straps can be used.
9. Remove cotter pin from upper balljoint.
10. Remove upper balljoint castle nut.
11. Using a pickle fork, separate upper balljoint from spindle. A large hammer can also be used to strike upright near balljoint. The jarring force will unseat the balljoint stud.
12. Remove upper arm pivot shaft nuts from engine side of shock tower, and remove upper arm.

13. Correctly orient control arm assembly for installation. The balljoint stud must point down and raised pivot shaft humps must point up, as shown on page 2.
14. Place a single 1/2" flat washer over each 1/2" mounting bolt.
15. Raise control arm into its mounting position, insert two bolts through the pivot shaft, and then through the shock tower mounting holes.
16. Secure bolts on engine side of shock tower using 1/2" flat washers, lock washers, and hex nuts. Torque hardware to 95 lb.ft.  
Optional Use: Mounting shim (7905-027) is only needed to compensate for variances in shock tower alignment. It may be necessary to use both on one side or none.
17. Install spring perch onto control arm mounting tabs.  
Torque hardware to 25-35 lb.ft.
18. Place upper balljoint stud into spindle upright tapered seat and install castle nut.  
Torque to 75-80 lb. ft.
19. Install cotter pin, and then bend ends in opposite directions so that they wrap around the stud.
20. Check all mounting hardware.
21. Using a spring compressor, reinstall coil spring. Follow tool manufacturer's instructions for proper use of spring compressor.
22. Make sure spring is correctly positioned at upper and lower spring seats.
23. Install shock and upper shock mount. Torque upper and lower mount hardware to 22-34 lb.ft.
24. Balljoints can now be lubricated using standard grease gun.
25. Install wheels to their original position and torque lug nuts.
26. Lower vehicle.

# Alignment

**The vehicle must be professionally inspected and aligned prior to regular use.**

If a trailer is not available, your alignment will need to be somewhat close to final specs in order to safely drive your vehicle to the alignment shop. Visually determine if the front wheels look straight. They should not appear to “toe” (left to right) -in or -out. The outside of the wheels should be very close to vertical. A few degrees of negative camber (leaning in) is acceptable.

Our recommended alignment specs serve as a starting point for your particular application. Installed components, driver preference, and specific application will have a great affect on the correct settings for your vehicle.

	Street Performance		Road Course		Drag Strip	
	Manual	Power	Manual	Power	Manual	Power
Caster	2-1/2° to 3° pos.	3-1/2° to 4° pos.	2-1/2° to 3° pos	3-1/2° to 4° pos	4° to 6° pos	4° to 6° pos
Camber	0° to 1/2° neg	0° to 1/2° neg	1-1/2° to 2° neg	1-1/2° to 2° neg	0°	0°
Toe (total)	1/16” to 1/8” in	1/16” to 1/8” in	1/16” out to 1/16” in	1/16” out to 1/16” in	1/16” to 1/8” in	1/16” to 1/8” in

## Adjusting the Arm

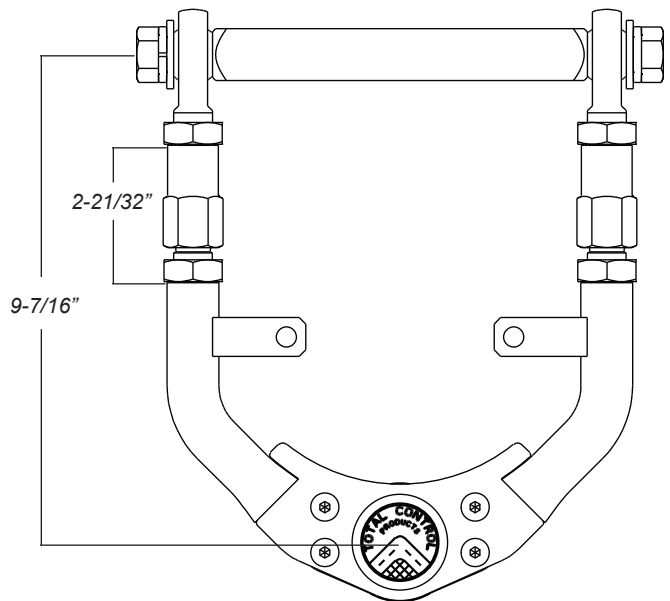
- Loosen jam nuts to allow adjustment of the couplers.
- A thread lubricant is recommended to make adjusting easier and to prevent damage to threads.
- Both Caster and Camber adjustments can be made at upper arm.
- Turning adjustment couplers in same direction equal amounts will adjust camber.
- Turning adjustment couplers in opposite direction equal amounts will adjust caster.

**Shortest adjustment** length is achieved with the rod end and adjustment coupler threaded completely into their female counterparts.

**Center of adjustment** is four complete turns of the adjustment coupler from the shortest adjustment length. With the jam nuts threaded to the base of the male threads, there should be four threads visible at each end.

**Longest adjustment** length is four complete turns of the adjustment coupler from center of adjustment travel. With the jam nuts threaded to the base of the male threads, there should be eight threads visible at each end. If longer adjusted length is needed, use shim/s (7905-027) between pivot shaft and shock tower. *Minimum thread engagement is 3/4”.*

## Center of Adjustment Dimensions



Adjustment range is + or - four threads.

**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 products. 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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Sacramento, CA 95828  
Phone: 916-388-0288  
Technical Support: [tcptech@cachassisworks.com](mailto:tcptech@cachassisworks.com)



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CALL CHASSISWORKS TECH SUPPORT (916) 388-0288 IF YOU NEED ASSISTANCE.



**VAS 132MS-350**  
**Bolt-In Front Air Spring Conversion**  
**Double-Adjustable - QuickSet 2**



### Shock Mounting Specifications

Part Number	Valving	Mounting		Total Travel	Compressed Length*	Extended Length*	Ride Height*	
		Upper	Lower				Min.	Max.
VAS 132MS-350	Double	Spherical Stem	Crossbar	3.50"	9.96"	13.46"	11.36"	12.06"

\* Shock mounting lengths are measured from the chassis contact surface of upper stem to pivot center of crossbar. Add .20" to lengths if measuring to control arm contact surface of lower crossbar.

### Valving

- **QuickSet 2 (double-adjustable)** - Features individual adjustment knobs that control bump (compression) and rebound (extension) stiffness independently.

### Inlet Port

- **1/4" NPT Pipe Thread**

NOTE: Some installations will have limited or inadequate clearance between the vehicle and the supplied 90-degree elbow swivel fitting. To safely attach the air line, a lower-profile 90-degree street elbow must be used before the swivel.

# PARTS LIST

Prior to beginning installation use the following parts lists to verify that you have received all components required for installation.

## VAS 132MS-350 - VariShock Air Spring, QuickSet

Part Number	Qty.	Description
3428-04-04-BN	2	90-degree Elbow Swivel, 1/4" x 1/4"
8F24XAX-35EK	2	QuickSet 2 Air Spring, Upper Stem and Short Lower Poly Mount
899-020-208	2	Ball-Stud Top Mount Hardware
899-061-304	1	Crossbar Hardware Bag

## 899-020-208 - Ball-Stud Top Mount Hardware

Part Number	Qty.	Description
3117-063-18C	1	Half Locknut 5/8-18 Nylon Insert
3144-25-28-0	1	Grease Zerk 1/4-28 Straight
899-044.63-1.13	1	Washer .635" ID x 1.13" OD, Zinc-Plated Steel
899-044.70-1.25	1	Washer .695" ID x 1.25" OD, Zinc-Plated Steel
899-060-201	1	Ball-Socket Stud Assembly

## 899-061-304 - Crossbar Hardware Bag

Part Number	Qty.	Description
3100-038C1.75Y	4	Bolt 3/8-16 x 1-3/4" Hex Head
3101-038-16C	4	Locknut 3/8-16 Nylon Insert
3106-63CK3.00B	2	Setscrew 5/8-11 x 3", (preinstalled in crossbar half)
3120-038S-Y	8	Washer 3/8" Flat SAE, Hardened
3140-2024-040	2	Sleeve 5/8" ID x 3/4" OD x 1-1/4" long
3141-2436-0.61H	4	Poly Bushing .75 ID x 1.125 OD, Flanged
3151-5ML	1	Poly Lube, 5ml Tube
899-042-4.66	4	Crossbar (E-2), 4.39" to 4.66" Bolt Centers

# INSTRUCTIONS

## Shock Assembly - Lower Crossbar

A VariShock coil-over is shown in place of the air-spring the following series of images. Assembly for the lower crossbar hardware is identical.

Open the 899-061-304 hardware bag and remove the parts shown. These items will be used to assemble the crossbar.



1. Using a 5/8-11 tap, chase the threads of the crossbar half that does not have the preinstalled setscrew.



2. Press two bushings into each shock eye.



3. Grease the inside of the bushings.
4. Press the sleeve into the bushings.
5. Place the crossbar half with the preinstalled setscrew in the vice.
6. Set the shock, with sleeve installed, over the setscrew.
7. Chase the threads of the crossbar half using a 5/8-11 tap.
8. Use a crescent wrench to screw the crossbar halves together until the assembly stops at the sleeve. You will feel a noticeable stop.



9. **CLOCKING STEP:** Tighten the assembly to the very first evenly-clocked position (less than one-half turn). Bring the crossbar into position in small increments and verify its position at each step; clocking it in one motion risks overtightening. A straightedge should be placed against the exposed crossbar tab to tell if the tab is inline with the vice jaws.
10. Once the tabs are correctly clocked, the shock crossbar assembly can be rotated perpendicular to the shock body as shown.



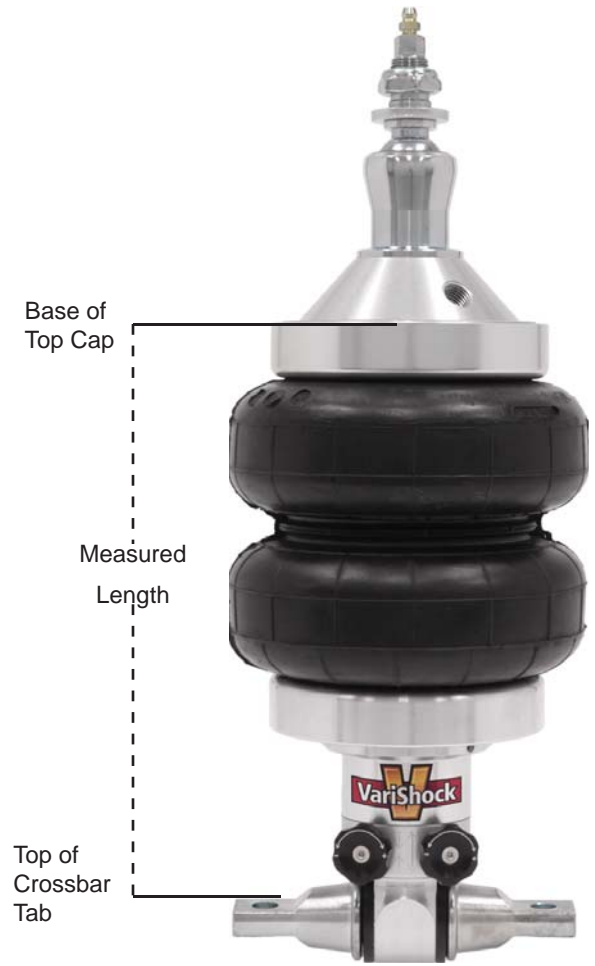
11. The shock is ready for the spring to be installed.



# VERIFY RIDE HEIGHT

After all suspension clearances have been checked and the shocks installed onto the vehicle with the springs, you must verify that the shocks rest at ride height within their allowable range of operation.

- The suspension must carry the full weight of the complete vehicle, including interior and passenger weight, with the wheels on the ground during measurement.
- Measure the length of the shock and compare to Shock Specifications chart to ensure you are within the Ride Height range. Baseline air pressure will need to be adjusted until both shocks measure equal to each other and are at the correct length.
- With the vehicle weight carried by the suspension, it is easier to get an accurate measurement from the base of the top cap to the top of the lower crossbar tab.
- Failure to operate the vehicle at the correct baseline air pressure will allow the damage the shock and related chassis and suspension components.



## Shock Ride-Height Specifications

Part Number	Valving	Mounting		Total Travel	Compressed Length*	Extended Length*	Ride Height*	
		Upper	Lower				Min.	Max.
VAS 132MS-350	Double	Spherical Stem	Crossbar	3.50"	6.61"	10.11"	8.01"	8.71"

\* Shock ride-height lengths are measured from the top corner of the upper bellow ring to the top surface of the lower crossbar. It is easiest to measure between these two points once the shock has been mounted to the vehicle.

# ShockWave™ Adjustment and Tuning Guide - QuickSet 2

This guide covers adjustment features and tuning procedures for VariShock ShockWave™ QuickSet 2, double-adjustable, air-spring, shock absorbers. The information contained has been greatly simplified and is only intended to get you started in the right direction. Suspension tuning involves multiple variables such as: bag air pressure, antiroll bar rates, vehicle weight distribution, tire sizes, tire pressures, suspension geometry, and track conditions. We highly recommend thoroughly researching suspension tuning and vehicle dynamics, or consulting an experienced professional.

## Travel Limiters

Shocks are not to be used as travel limiters. An extension travel limiter, such as a strap or cable, should be used to prevent topping out and damaging the shocks. The installed compression bumper protects the shock if bottomed out during normal use. Vehicles that consistently bottom out shocks or land harshly from wheel stands should increase bag air pressure along with some form of suspension stop to limit compression travel without directly impacting the shock body. Any shock will be damaged if the car is dropped from a wheel stand.

## Ride Height

When a shock is at ride height a certain amount of travel is available in either direction. Depending upon performance application, shock travel will be reserved in different percentages for compression or extension.

### Street Baseline: 60-percent Bump, 40-percent Rebound

Street vehicles require more available compression (bump) travel for improved ride quality and unexpected road hazards. At baseline ride height, the shock and spring should collapse 40-percent from their installed heights. This results in 40-percent of travel available for extension and 60-percent for compression travel.

### Handling Baseline: 50-percent Bump, 50-percent Rebound

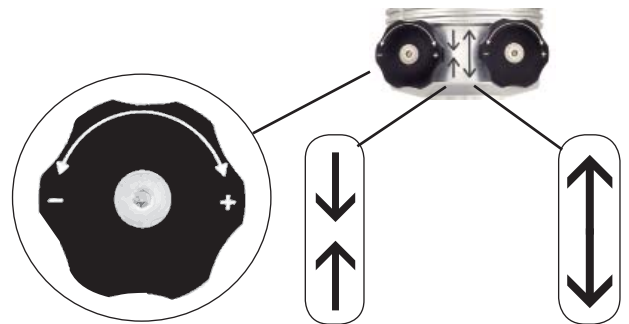
Handling performance applications are usually limited to smooth prepared road-course- or autocross-tracks, therefore less compression travel is required. Suspension geometry or track conditions may require the travel percentages to be shifted to prevent topping- or bottoming-out the shock.

### Drag Race Baseline: 40-percent Bump, 60-percent Rebound

Drag race vehicles generally require more extension (rebound) travel to help weight transfer, and because the drag strip is very flat, less compression travel is needed. The amount of extension travel available in the shock will drastically affect how the car works. At baseline ride height, the shock and spring should collapse 60-percent from their installed heights. This results in 60-percent of travel available for extension and 40-percent of compression travel.

## Baseline Air Pressure Selection

Air pressure affects ride quality, ride height, stored energy, weight transfer and how effectively the front suspension handles downward movement after drag race launches. Differences in vehicles such as specific performance application, weight reduction and chassis stiffening should be taken into consideration. Air pressure will vary greatly from vehicle to vehicle, but anywhere from 40 psi to 100 psi is normal. The recommended air pressure is based on common combinations of weight of the car and baseline ride height. Refer to the Shock Specifications chart on page one for the required ride-height range of your specific model ShockWave™.



## Adjustment Features

The QuickSet 2 valve system features dual adjustment knobs that independently control bump- and rebound-damping stiffness of the shock. Dual-arrow symbols engraved into the shock body demonstrate the function of each knob. Arrows pointing toward each other designate bump (compression) adjustment; the shock collapsing. Arrows pointing away from each other represent rebound (extension) adjustment; the shock extending. Knobs are clearly etched indicating the correct direction of rotation to

Symbol	Direction	Effect
+	Clockwise	Increase Stiffness
-	Counter-Clockwise	Decrease Stiffness
↓ ↑		Bump (compression) Adjustment
↕		Rebound (extension) Adjustment

decrease (-), or increase (+) damping stiffness. There are 16 specific adjustment positions for each knob, with a total of 256 unique combinations possible.

Position 1, the softest setting, is found by turning the knob in the counter-clockwise direction until the positive stop is located. Rotating the knob in the clockwise direction increases damping stiffness. Each of the 16 settings is indicated by a detent that can be felt when turning the knob, and an audible click as the knob gently locks into position. Only very light force is necessary to rotate the knob past each detent. If access to the adjustment knobs is limited, a 5/64 or 7/64 (depending upon model) ball-drive Allen wrench can be used to adjust the knob. Do not force the knob beyond its intended stop, doing so will damage the valve mechanism.

**Note:** VariShocks have a substantial range of adjustment with very little bypass or internal bleed. Due to our minimal-bleed design, shocks will feel extremely stiff at some settings when operated by hand, whereas other shocks with excessive bleed will move more freely. Manual comparison should not be performed. A person cannot manually operate the shock at a rate anywhere near real life conditions and any results found in this manner will be meaningless. Prior to shipping, every VariShock is dynamometer (dyno) tested and calibrated throughout an accurate range of shaft speeds and cylinder pressures found in real-world operation.

### The Truth About 16- vs. 24-Clicks

Don't be fooled by shocks offering more adjustment clicks. They are actually 1/2-click adjustments. The manufacturer merely added more detents to the mechanism without increasing the range of adjustment. This practice gives more clicks, but the adjustment is so slight that your vehicle will not respond to the change. A 16-position VariShock actually has a broader range of adjustable force with the added benefit of a more manageable number of adjustments to try.

### Tuning Procedures - QuickSet 2

VariShock shock absorber's broad range of adjustment is suitable to the three categories of suspension tuning: ride quality, handling performance, and drag racing. All three tuning categories have the common goal of controlled weight transfer, but have greatly differing vehicle-dynamic requirements. Each will be discussed in the following text. Before proceeding verify that all suspension components, such as control arms, balljoints, and bushings are in acceptable condition and that tire pressures are correctly set.

### Tuning for Ride Quality - QuickSet 2

Tuning for ride quality generally involves mid-range pressures matched with softer shock settings to achieve a smooth and comfortable ride. Testing and adjustment is required to attain desirable results. When properly adjusted the vehicle should feel settled without continued bouncing (too soft), excessive harshness (too stiff), or fore/aft pitching.

### Prior to Testing

Begin with the shocks adjusted to the number 3 position for both bump and rebound. The first two settings are generally too soft for street use and are normally used in drag racing applications.

### Find Harshness Threshold

The bump setting mainly controls the rapid upward movement of the suspension as the tire travels over rough or bumpy surfaces. Increase shock bump stiffness by one, then test again. Continue increasing stiffness and testing until the vehicle begins to feel harsh over bumps. From this setting, decrease shock bump stiffness by two. The harshness threshold setting may differ from front to rear.

<b>Excessive Chassis Movement (compression)</b>	Increase Bump Stiffness	The bump setting also affects larger downward chassis movements such as brake dive, squatting, and body roll. Increase shock bump stiffness by one, then test again. Note: As bump stiffness is increased, road noise and vibration will also increase.
<b>Excessive Chassis Movement (extension)</b>	Increase Rebound Stiffness	The rebound setting mainly controls vehicle weight transitions such as front end rise during acceleration, rear end rise during braking, body roll. If vehicle exhibits rapid weight shifts or continues to oscillate more than one suspension cycle before settling, increase shock rebound stiffness by one, then test again.  Note: Stiffening rebound does not reduce the amount of lean or dive in a sustained turn or braking maneuver, but does slow the rate of weight transfer to minimize unexpected changes in the cars handling.

<b>Fore/Aft Pitching</b> (constant speed 50-70 mph)	Alter Front-to-Rear Stiffness Difference	If vehicle exhibits fore/aft pitching at highway speeds, rear shock rebound should be stiffened or conversely, front shock rebound softened. Ideally the rear suspension should oscillate at a slightly quicker rate than the front to minimize pitching.
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## Tuning for Handling Performance - QuickSet 2

Mid-range pressures matched with stiffer shock settings generally contribute to improved handling performance by reducing chassis movement. Stiffer tuned suspension increases vibration transferred to the vehicle and passengers, but is usually tolerated for performance gains. When properly adjusted the vehicle should feel responsive, exhibit balanced cornering grip, and maintain traction over irregular surface conditions. Extensive testing and adjustment is critically important when operating your vehicle at or near its performance limits. Testing must be done in a safe and controlled environment, such as a dedicated motorsports facility.

### Prior to Testing

Begin with the shocks adjusted to the number 5 position for both bump and rebound. The first four settings are generally too soft for performance applications and are normally used in drag racing or street applications.

### Find Harshness Threshold

The bump setting mainly controls the rapid upward movement of the suspension as the tire travels over rough or bumpy surfaces. Increase shock bump stiffness by one, then test again. Continue increasing stiffness and testing until the vehicle begins to feel harsh over bumps, or a reduction of traction, cornering, braking or acceleration ability is experienced. From this setting, decrease shock bump stiffness by one. The harshness threshold setting may differ from front to rear.

<b>Excessive Chassis Movement</b> (compression)	Increase Bump Stiffness	The bump setting also affects larger downward chassis movements such as brake dive, squatting, and body roll. Increase shock bump stiffness by one, then test again. Note: As bump stiffness is increased, road noise and vibration will also increase.
<b>Excessive Chassis Movement</b> (extension)	Increase Rebound Stiffness	The rebound setting mainly controls vehicle weight transitions such as front end rise during acceleration, rear end rise during braking, and body roll. If vehicle exhibits rapid weight shifts or continues to oscillate more than one suspension cycle before settling, increase shock rebound stiffness by one, then test again. Note: Stiffening rebound does not reduce the amount of lean or dive in a sustained turn or braking maneuver, but does slow the rate of weight transfer to minimize unexpected changes in the cars handling.
<b>Shocks Bottoming Out</b> (body roll, brake dive or squatting)	Increase Bump Stiffness	If chassis movement during cornering or braking allows shocks to bottom out, increase shock stiffness by one, then test again. If increasing bump stiffness cannot extend weight transfer duration long enough, increase air pressure by 2 psi, then test again.
<b>Understeer Condition</b> (Neutral throttle) Car turns less than expected; commonly referred to as push, plow, or tight.	Change Bump Stiffness Bias Toward Rear	If vehicle exhibits understeer when cornering at neutral throttle, rear shock bump should be stiffened or conversely, front shock bump softened. A slight amount of understeer is considered safe and reduces the chances of spinning.
<b>Oversteer Condition</b> (Neutral throttle) Car turns more than expected; commonly referred to as tail-happy or loose.	Change Bump Stiffness Bias Toward Front	If vehicle exhibits oversteer when cornering at neutral throttle, front shock bump should be stiffened or conversely, rear shock bump softened. Oversteer increases the vehicles tendency to spin when cornering and requires driver experience and skill to manage safely. This condition should be avoided by novice drivers.

## **Tuning for Drag Racing - QuickSet 2**

Required settings for drag racing applications vary greatly depending upon, vehicle weight, weight distribution, suspension geometry and travel, horsepower, and available traction. A properly tuned drag race suspension enables the vehicle to launch straight while transferring weight to the rear tires in an efficient, controlled manner. Extensive testing and adjustment is critically important when operating your vehicle at or near its performance limits. Testing must be done in a safe and controlled environment, such as a dedicated motorsports facility. It is generally better to tune shocks according to improvements in ET's (Elapsed Times) rather than for specific occurrences such as the amount of wheel stand. Due to differences in weight distribution, wheel base, tire size, and horsepower, not all vehicles leave the starting line in the same manner once their suspension has been optimized. Watch your ET's and if your times start to get slower return to the prior adjustment. Once you have completed the following procedures, only fine adjustments may be needed to tune for specific track conditions.

### **Prior to Testing**

Make certain that wheelie bars are raised as high as possible while maintaining control and eliminating their influence as much as possible on damper settings. Begin with shocks adjusted to the number 3 position for bump and rebound.

### **Initial Testing**

First verify that the vehicle tracks straight before aggressively launching from the line. Begin with light acceleration and low speeds. If the vehicle tracks and drives acceptably at this level, make incremental increases in acceleration and top speed until the vehicle is safe at higher speed. Vehicles not tracking straight at speed should verify all chassis settings including but not limited to alignment, bump steer, tire pressures, etc. Once the vehicle drives in a safe manner at speed, move on to test launching.

Test launches should consist of only the initial launch with no subsequent gear changes. Begin with low rpm launches and gradually increase rpm and severity if the car launches acceptably. At this time we are only determining that the car launches in a controlled manner to avoid damaging components or the vehicle. The vehicle should leave in a straight line without extreme wheel standing or harsh bounces. Sudden, uncontrollable front end lift should be corrected by making suspension instant center adjustments, if possible. More gradual front end lift can be corrected by adjusting the shock valving. If the car gradually wheel stands or bounces violently, adjust front suspension first, then rear. If there is rear tire shake, wheel hop or excessive body separation, adjust rear suspension first, then front. If your car is launching severely to the right or left, first check that the rear end is centered and there is no preload adjusted into the rear suspension. If the car still launches severely to the right or left, you will have to add preload to the rear suspension. If everything checks out okay and the car only minimally drives to the right or left, you can stagger the rear shock valving to correct this.

When a vehicle launches slightly toward the right, rebound (shock extension) stiffness is added to the driver side and bump (shock compression) stiffness is added to the passenger side. A vehicle launching slightly toward the left would make the opposite adjustments. It is not recommended to have more than two clicks difference side to side for either bump or rebound. Rear shock adjustments are only applicable to correcting the launch and will have little to no affect on down track performance.

After the car has been adjusted to launch straight, test launch and include the first gear change. Make any required adjustments and add the next gear change. Repeat until the car can be launched straight and driven at speed safely. The car is now ready for fine tuning to optimum results.

### **Front Shock Adjustment**

Pay close attention to what is happening to the front end during launch. Your goal is to eliminate all jerking or bouncing movements during launch and gear shifts. Ideally the front end should rise in a controlled manner, just enough to keep the rear tires loaded, then continue the pass with smooth transitions at all times. Front end rise without any appreciable traction gain is wasted energy that should be used to propel the vehicle forward instead of up. While testing, document your ET's along with any changes made. If ET does not improve, return to previous settings.

### **Front Rebound (Extension) Adjustment Overview**

Too light of a rebound (extension) setting allows excessive front end chassis separation and may result in the front wheels jerking violently off the ground during launch. Also, during gear change, too light a setting allows the car to bounce off its front rebound travel limiter and then bottom out in an oscillating manner. Too firm a setting will prevent the front end from rising sufficiently, limiting the amount of weight transferred to the rear tires. Adjust the rebound setting in one click increments to control the rate at which the front end rises at launch and during gear changes. While testing, document your ET's along with any changes made. If ET does not improve, return to previous settings.

<b>Front Wheels Lose Contact with Ground</b>	Increase Rebound Stiffness	Violent chassis separation and may result in jerking the front wheels off the ground. Increase shock rebound stiffness by one, then test again.
<b>Rear Tires Hook Then Lose Traction</b>	Increase Rebound Stiffness	If weight transfer occurs too quickly the rear tires may hook then lose traction as the front end begins to travel downward. Slowing the rate at which the front end rises prevents the shocks from topping out too quickly and increases the duration of time that the rear tires benefit from the weight transfer. Increase shock rebound stiffness by one, then test again.
<b>No Front End Rise</b>	Decrease Rebound Stiffness	Too firm of a shock setting limits the amount of weight transferred to the rear tires, resulting in poor traction. Decrease shock rebound stiffness by one, then test again.

### Front Bump (Compression) Adjustment Overview

After the launch or during a gear change, a firm bump setting will cause the chassis to bounce off the front tire as the chassis settles down. Too light of a bump setting allows the shock to bottom out and bounce off the stop travel bumper. Adjust bump in one click increments to control the amount and rate at which the front end settles during gear change. While testing, document your ET's along with any changes made. If ET does not improve, return to previous settings.

<b>Front "Bottoms Out" After Launch</b>	Increase Bump Stiffness	If front suspension settles too fast after launch or gear change it may cause the front suspension to bottom out at the end of its downward travel. If the suspension bottoms out hard enough, rear traction may be lost. Increase shock bump stiffness by one, then test again. If increasing bump stiffness cannot extend weight transfer duration long enough, increase air pressure by 2 psi, then test again.
<b>Hard Front End Bounce</b> (After Launch or Gear Change)	Decrease Bump Stiffness	If the tires cause the front end to bounce upon landing, the shocks are too stiff. The front end should settle in a single, smooth motion. Decrease shock bump stiffness by one, then test again. This can be a very subtle problem. Watch the front tire sidewall as it contacts the ground.

### Rear Shock Adjustment (Double Adjustable)

Maintain traction by controlling the rate at which torque and weight is transferred to the rear tires. Ideally the rear suspension should be as firm as possible before a loss of traction occurs. Changes to the vehicle such as ride height, tire size, weight distribution, or suspension link adjustments will alter the instant center location in relation to the vehicle's center of gravity. Any shift of either the instant center or center of gravity will usually require a shock setting adjustment to optimize traction. While testing, document your ET's along with any changes made. If ET does not improve, return to previous settings.

<b>Rear End Squats</b>	Increase Bump Stiffness	Some vehicles will squat during launches instead of pushing the vehicle forward. To assist in planting the tires, increase shock bump stiffness by one, then test again.
<b>Vehicle Separates from Rear End</b>	Increase Rebound Stiffness	Some suspension geometries plant the tires so forcefully that the rear end of the vehicle rises away from the housing too rapidly. The vehicle may hook initially, then spin the tires once the shocks are topped out. Slowing the rate at which the rear end rises increases the duration of time that the rear tires benefit from the improved traction. Increase shock rebound stiffness by one, then test again.
<b>Loss of Traction with Minimal Chassis Movement</b>	Decrease Bump/ Rebound Stiffness	A suspension system that is too stiff can hit the tires too hard, causing a loss of traction. Softening the suspension slows the transfer of weight and reduces the initial tire shock. Minimal chassis movement makes it very difficult to visually tell if the bump or rebound needs to be decreased. We suggest adjusting bump first and watch for a gain or loss in the ET. If ET does not improve, return to previous setting, then adjust rebound instead and test again.

### Completion of Testing

When all adjustments have been completed, reset your wheelie bars as low as possible without affecting your ET.

**Notes:**

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