

GENERAL MOTORS

BUICK EXCEPT SPECIAL & SKYLARK (1964-72)

Caster and camber adjustments are made by adding or removing shims between upper control arm inner shaft and brackets on frame.

CASTER & CAMBER ADJUSTING NOTE – Shim pack at any one location must not exceed .500" (1964-67); .600" (1968-72). After adjustment is completed, torque control shaft bolts to 90-110 ft. lbs. (1964); 75-100 ft. lbs. (1965-66); 65-85 ft. lbs. (1967); 75 ft. lbs. (1968-72).

Caster

To increase caster, decrease amount of shims at front bolt and increase by an equal amount at rear bolt. To decrease caster, increase amount of shims at front bolt and decrease by an equal amount at rear bolt.

Camber

To increase camber, remove an equal amount of shims at front and rear bolt. To decrease camber, add an equal amount of shims at front and rear bolt. To increase camber and caster simultaneously, remove shims at front bolt only. To decrease camber and caster simultaneously, add shims at front bolt only.

BUICK SPECIAL & SKYLARK (1964-72)

Caster and camber adjustments are made by adding or removing shims between upper control arm inner shaft and brackets on frame.

CASTER & CAMBER ADJUSTING NOTE – Shim pack at any one location must not exceed .380" (1964-65); .750" (1966-72). After adjustment completed, torque upper arm mounting bolt nuts to 60-75 ft. lbs. (1964); 45-60 ft. lbs. (1965-67); 50 ft. lbs. (1968-72).

Caster

Adding shims at front bolt location will change caster toward negative. **NOTE** – This will also change camber toward negative. Adding shims at rear location will change caster toward positive. **NOTE** – This will also change camber toward negative.

Camber

Adding equal amounts of shims at both front and rear bolts will change camber toward negative. **NOTE** – Caster will not be changed.

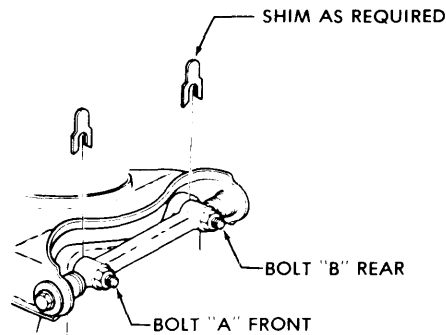
BUICK (ALL MODELS) (1973)

Caster and camber adjustments are made by adding or removing shims between upper control arm inner shaft and brackets on frame.

CASTER AND CAMBER ADJUSTMENT

FOR CASTER AND CAMBER DIMENSIONS, SEE WHEEL ALIGNMENT AND SPEC CHART.

FOR INCREASED OR POSITIVE CASTER, DECREASE SHIMS AT BOLT "A" AND INCREASE SHIMS AT BOLT "B" BY TWICE THIS AMOUNT



FOR DECREASED OR NEGATIVE CASTER, INCREASE SHIMS AT BOLT "A" AND DECREASE SHIMS AT BOLT "B" BY TWICE THIS AMOUNT

FOR INCREASED CAMBER, DECREASE SHIMS AT BOTH "A" AND "B" BOLTS. SHIMMING GREATER THAN .750 NOT PERMISSIBLE

SHIM THICKNESS AT "A" AND "B" LOCATION TO BE WITHIN .40 OF EACH OTHER

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BUICK CAMBER & CASTER ADJUSTING SHIMS

Adding shims at front bolt location will change caster toward negative. **NOTE** – This will also change camber toward negative. Adding shims at rear location will change caster toward positive. **NOTE** – This will also change camber toward negative.

Adding equal amounts of shims at both front and rear bolts will change camber toward negative. **NOTE** – Caster will not be changed.

CASTER/CAMBER ADJUSTING NOTE – Shim pack at any one location must not exceed .750". After adjustment, torque upper arm mounting bolt nuts to 75 ft. lbs.

CADILLAC (EXC. ELDORADO) (1964-73)

► **1965 CADILLAC INABILITY TO OBTAIN SUFFICIENT LEFT WHEEL CAMBER CORRECTION** – Late models have redesigned front upper arm shaft that allows 1/2" more positive camber on left side. Earlier cars may have special camber eccentric, Part No. 1486513, installed to permit 1/4-3/8" more positive camber adjustment. On some cars it may also be necessary to set **caster** to extreme negative specification ($-1\frac{1}{2}^{\circ}$), to obtain sufficient positive camber.

Wheel Alignment

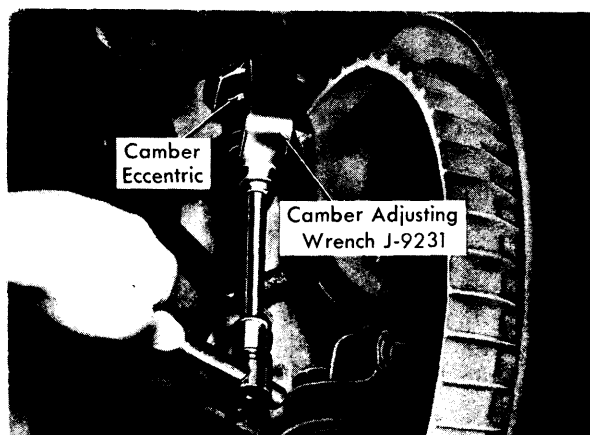
GENERAL MOTORS (Cont.)

►1968-72 CADILLAC CASTER & CAMBER ADJUSTMENT
CAUTION – When working on front end, caution should be used to prevent any damage to brake line. When removing camber eccentric or disconnecting upper control arm ball stud, do not use brake line for support.

Caster adjustment is made by turning locknuts on forward ends of tie-struts at front frame crossmember. **NOTE** – To gain access to locknuts, it is necessary to remove air deflector at bottom of radiator. Camber adjustment is made at the camber eccentric located in steering knuckle upper support. Upper spherical joint stud fits through camber eccentric and knuckle. Turning the camber eccentric repositions upper spherical joint stud.

Caster

NOTE – Before adjusting caster, loosen tie-struts at lower suspension arms to allow tie-strut to center itself and thus prevent damage to bushings and premature wear at frame front crossmember. To provide more negative caster, lengthen tie-struts by loosening front locknuts and tightening rear locknuts. To provide more positive caster, shorten tie-struts by loosening rear locknuts and tightening front locknuts. One turn of locknuts results in approximately $\frac{1}{2}^{\circ}$ change in caster. After proper adjustments have been made, tighten tie-strut mounting bolts at lower arm to 35 ft. lbs. (1964-65); 55 ft. lbs. (1966-73). Tighten front locknuts to 35 ft. lbs. (1964-73). **NOTE** – When tightening front locknut, hold rear locknut securely to prevent change in caster setting.



CADILLAC CAMBER ADJUSTING TOOL

Camber

Loosen nut on spherical joint stud one turn and strike steering knuckle in area of spherical joint stud to free camber eccentric in steering knuckle. Use care to avoid hitting brake hose or joint seal. Using a suitable camber adjusting wrench (J-9231, J-23415), turn camber eccentric until desired camber is obtained. **NOTE** – Left wheel on 1964-69 cars must have

$1/4^{\circ}$ - $1/2^{\circ}$ more positive camber than right wheel to compensate for crowned roads. Final position of joint stud should be in rear portion of camber eccentric in order to keep steering angle correct. After adjustment, tighten lock nut to 60 ft. lbs.

CADILLAC ELDORADO (1967-73)

Caster and camber adjustments are made by turning upper control arm front and rear cam bolts. **NOTE** – If front cam is turned for more positive camber, then caster also becomes more positive. If rear cam is turned for more positive camber, then caster becomes more negative. After making adjustments, tighten cam nuts to 75 ft. lbs. (1964-70); 95 ft. lbs. (1971-73).

Camber & Caster

Loosen nut on upper control arm front cam bolt, note camber reading, then rotate front bolt to correct for HALF of the incorrect reading and tighten nut. Loosen nut on rear cam bolt, and rotate cam to bring camber reading to 0° , then tighten nut. If caster does not need adjustment, tighten cam nuts. If caster needs adjustment, loosen front cam bolt and rotate cam so camber changes an amount equal to $1/4$ of the desired caster change. If adjusting for excessive negative caster, rotate bolt to increase negative camber. Tighten front nut. Loosen rear cam nut and rotate cam until camber setting returns to 0° (this will result in correct caster setting). Tighten cam nuts and recheck adjustment.

CAMARO (1967-70), CHEVELLE (1964-70) CHEVY II (1968-70)

Caster and camber adjustments are made by adding or removing shims between upper control arm inner shaft and mounting bracket on frame. After adjustment completed, torque control arm shaft bolts to 45-55 ft. lbs. (Chevrolet); 55-75 ft. lbs. (1964 Chevelle); 65-80 ft. lbs. (1965 Chevelle); 45-55 ft. lbs. (1966-69 Chevelle, 1967-70 Camaro, 1968-70 Chevy II).

Caster

Addition of shim at front bolt or removal of shim at rear bolt will decrease positive caster. A $1/32$ " shim change will change caster $1/4$ - $1/2^{\circ}$.

Camber

Addition of shims equally at both front and rear bolts will decrease positive camber. A $1/32$ " shim change at both points will change camber $1/6^{\circ}$ (Chevrolet), $1/5^{\circ}$ (Chevelle, Camaro, Chevy II).



CHEVELLE CASTER & CAMBER ADJUSTING SHIMS

GENERAL MOTORS (Cont.)

CHEVROLET (1965-70) CHEVY II (1964-67)

Caster adjustments are made by lengthening or shortening the lower control arm strut at front underbody connection. Camber adjustments are made by rotating eccentrically mounted washers located on lower control arm inner pivot bolt.

Caster

Turn the two nuts at front end of lower control arm strut as necessary. Shortening the strut rod increases caster. Lengthening the rod decreases caster. When adjustment is completed, tighten inside nut to 70-90 ft. lbs., and outside nut to 50-70 ft. lbs.

Camber

Loosen lower control arm inner pivot bolt nut, turn bolt to rotate cams as necessary to move control arm in or out for correct camber. After adjustment completed, tighten pivot bolt nut to 100-125 ft. lbs. (Chevrolet), 55-70 ft. lbs. (Chevy II).

CHEVROLET (EXC. VEGA, CORVETTE) (1971-73)

Caster & Camber Adjustment

Caster and camber adjustments are made by means of shims inserted between upper control arm shaft and the frame bracket. Shims may be added, subtracted or transferred to change the settings. Loosen control arm shaft nuts to insert shims.

Caster

Transfer shims, front to rear or rear to front. The transfer of one shim to front bolt from rear bolt will decrease positive caster.

Camber

Change shims at both the front and the rear of the support shaft. Adding an equal number of shims at both front and rear of the support shaft will decrease positive camber. Tighten upper control arm shaft nuts to following specifications:

Model	Torque (Ft. Lbs.)
Chevrolet	60
Chevelle & Monte Carlo	40
Nova	40
Camaro	60

CORVAIR CARS & GREENBRIER (1960-69) (FRONT WHEELS)

Caster adjustments are made by lengthening or shortening lower control arm strut in the 500, 700 and 900 series, while in the 1200 series caster adjustment is made by adding or removing shims between upper control arm inner shaft and mounting bracket at either front or rear mounting bolts. Camber adjustments on 1960-64 cars are made by adding or removing shims between upper control arm inner shaft and mounting bracket equally at front and rear mounting bolts. On 1965-69 cars, camber is adjusted by rotating eccentrically mounted washers located on lower control arm inner pivot bolt.

Caster

Series 500, 700, 900 – Adjust caster by turning nuts at rear of strut rod. Lengthening rod increases caster. Shortening rod decreases caster. *NOTE* – *Because of manufacturing tolerances, it is possible to run out of threads on strut rod or cause front spring to be cocked in its seat and rub spring tower. Only when this happens is it permissible to shim unevenly at upper control arm.* If shims are changed, check camber.

Series 1200 – To obtain correct caster loosen upper control arm support shaft-to-crossmember bolts and add or remove shims at either front or rear bolt. *NOTE* – *To adjust right side, direct air heater front duct must be removed for access to upper control arm shaft attaching bolts.*

Camber

All Except 1965-67 Cars – To adjust camber, loosen upper control arm shaft-to-crossmember bolts, add or remove shims **equally** as required at front and rear bolts (adding shims will decrease positive camber). A 1/32" shim change will change camber 1/6°. After adjustment completed, tighten shaft bolts to 38-50 ft. lbs. (Series 500, 700, 900), 65-85 ft. lbs. (Series 1200). *NOTE* – *It may be necessary to remove wheel to tighten these bolts.*

1965-69 Cars – Loosen lower control arm inner pivot bolt nut, turn bolt to rotate cams as necessary to move control arm in or out for correct camber. After adjustment completed, tighten pivot bolt nut to 90-120 ft. lbs. (1960-67); 80 ft. lbs. (1968-69).

CORVAIR GREENBRIER (1960-65) (REAR WHEELS)

Caster

NOTE – *These specifications are reference dimensions only, in that no provision for adjustment of this item is provided.*

Camber

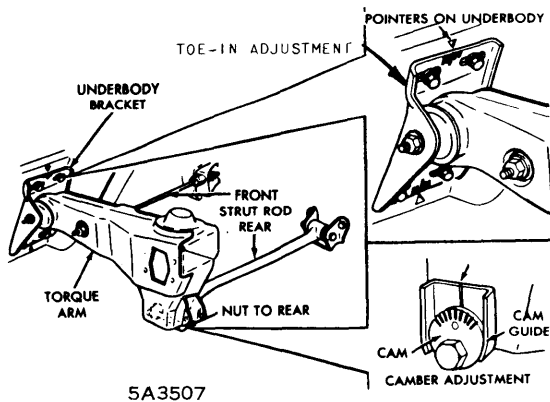
NOTE – *Neither caster or camber of rear wheels is adjustable in either series, and specifications are reference dimensions only. If camber is not within limits, either the crossmember is out of alignment, has become distorted due to collision, or control arm is bent.*

Toe-In

NOTE – *If drive-on equipment is used, reverse car and back into position. Toe-in (overall) will be read as toe-out (readings taken from rear of tires rather than front). To adjust, add or remove shims equally from each side of front edge of transmission case, with engine rear support loosened. CAUTION – Shims must be added or removed equally, from each side. DO NOT attempt to adjust one wheel at a time. A shim added to each side will increase toe-in. Removal of shim from each side will decrease toe-in. NOTE – Because of manufacturing tolerance and parts "stack-up", it is possible to have toe-out on one wheel and toe-in on opposite wheel. In this case, adjust the wheel with toe-out as close as possible to specifications, but not letting opposite wheel go out of specifications. If, for example, one wheel toes-out by 1/4", then opposite wheel must toe-in enough to give overall specified toe-in.*

Wheel Alignment

GENERAL MOTORS (Cont.)



1965 CORVAIR CAR REAR SUSPENSION
CAMBER & TOE-IN ADJUSTMENT

CORVAIR CARS (1965-69) (REAR WHEELS)

Camber is adjusted by turning eccentric cams on rear strut outer pivot bolt at wheel support. Toe-in is adjusted by shifting torque control arm mounting bracket on underbody. **NOTE - Always adjust camber first.**

Camber

Loosen rear strut rod outer pivot bolt nut, turn bolt as necessary to rotate cams for specified camber. After adjustment completed, tighten pivot bolt nut to 75-90 ft. lbs.

Toe-In

Loosen front strut rod inner bracket-to-transmission support bolts so that bracket is loose (bracket bolt holes are slotted). Loosen torque control arm forward support bracket-to-underbody bolts so that bracket can be moved, shift torque control arm and bracket in or out (mounting bolt holes are slotted) for correct toe-in. Tighten torque control arm bracket bolts and front strut inner bracket bolts to 20-30 ft. lbs. **NOTE - After adjustments completed, allow vehicle weight to rest on all four wheels while retightening front strut inner bracket-to-crossmember bolts.**

VEGA 1971-73

Camber and caster adjustments are made by the cam bolts which are the attachment for the lower control arm. The front cam adjusts the camber and must be made first. The rear cam adjusts the caster.

Camber

Loosen front lower control arm pivot nut and rotate cam until proper setting is achieved.

Caster

Loosen rear lower control arm pivot nut and rotate cam until proper setting is achieved.

NOTE - Tighten lower control arm cam nut to 125 ft. lbs. when adjustments are completed.

CORVETTE (1963-69) (FRONT WHEELS)

Caster and camber adjustments are made by adding or removing shims between upper pivot shaft and frame side rail support bracket.

Caster

To adjust caster, loosen front and rear bolts of upper control arm support shaft and add or remove shims from either bolt as required. Adding shims at the front bolt or removing shims at rear bolt will decrease positive caster. A 1/32" shim will change caster 1/4° (1963-67), 1/2° (1968-69).

Camber

To adjust camber, add or remove shims at both front and rear bolts of upper control arm support shaft. A 1/32" shim will vary camber 1/6°. After adjustments are completed, tighten upper control arm support shaft bolts to 65-75 ft. lbs. (1963-67), 50 ft. lbs. (1968), 65 ft. lbs. (1969).

CORVETTE (1963-69) (REAR WHEELS)

Camber

Camber adjustments made by turning cam type through bolts which ride within channels on strut rod bracket. To change camber setting, loosen locknut on cam bolt, turn the cam to desired camber, then torque locknut to 55-70 ft. lbs. (1963-67), 95 ft. lbs. (1968), 65 ft. lbs. (1969).

CORVETTE (1970-73)

Caster and camber adjustments are made by adding or removing shims between upper pivot shaft and frame side rail support bracket.

Caster

To adjust caster, loosen front and rear bolts of upper control arm support shaft and add or remove shims from either bolt as required. Adding shims to the front of the bolt or removing shims from the rear of the bolt will decrease positive caster. A 1/32" shim will change caster 1/2°.

Camber

To adjust camber, add or remove shims at both front and rear bolts of upper control support shaft. A 1/32" shim will vary camber 1/6°. After adjustments are completed, tighten upper control arm support shaft to 65 ft. lbs.

CORVETTE (1970-73) (REAR WHEELS)

Camber

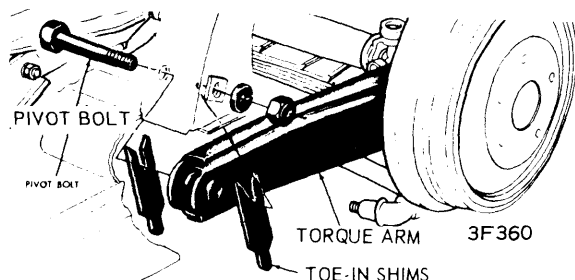
Camber adjustments are made by turning cam type through bolt which rides within channels on strut rod bracket. To change camber setting, loosen locknut on cam bolt, turn the cam to desired setting, then torque lock nut to 60 ft. lbs.

Toe-In

Rear wheel toe-in angle is adjusted through use of variable thickness shims inserted between torque arm and frame side member web at forward pivoting joint. Shims are slotted to slide over bushing pivot bolt on either side. To adjust toe-in, loosen pivot bolt, shim outboard gap as necessary to obtain solid stack-up between outer end of torque arm bushing and inner wall of frame side member, and when adding shims to inner side of control arm do not use thicker

GENERAL MOTORS (Cont.)

shim than necessary or force insertion of shim as this may cause toe-in setting to change. After shims are securely installed, tighten pivot bolt to 40-60 ft. lbs. (1963), 45-55 ft. lbs. (1964-69).



1963-73 CORVETTE REAR SUSPENSION TOE-IN SHIMS

OLDSMOBILE (EXC. TORONADO) (1964-73)

Caster and camber adjustments are made by adding or removing shims at upper control arm inner shaft and mounting bracket bolts. After adjustment is completed tighten shaft bolts to 100-150 ft. lbs. (1964 Exc. F-85), 60-85 ft. lbs. (1964 F-85), 75 ft. lbs. (1965-67), 50 ft. lbs. (1968-70), 50 ft. lbs. (1971-72 F-85), 75 ft. lbs. (1971-72 88, 98 Series), 50 ft. lbs. (1973 Omega), 85 ft. lbs. (1973 Cutlass, 88, 98 Series).

Caster

To decrease positive caster and increase negative caster, add shims at front bolt. To increase positive caster and decrease negative caster, remove shims at front bolt. Removal or installation of .030" shim will change caster 1/4° (F-85), 1/8° (All Others).

Camber

Add or remove shims equally at both front and rear of shaft attaching bolts. To increase camber, remove shims at both front and rear of bolts. To decrease camber, add shims at both front and rear of bolts. Removal or installation of .020" shims will change camber 1/8° (1964 exc. F-85); .030" shims will change camber 1/8° (1965-71 exc. F-85); 1/4° (1964-71 F-85); 3/16° (1972 F-85); 5/32° (1972 All Others).

OLDSMOBILE TORONADO (1964-73)

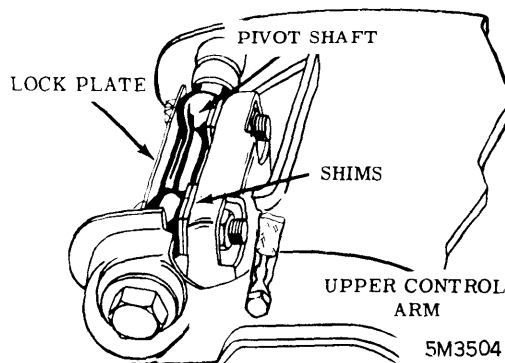
Caster and camber adjustments are made by rotating eccentric cam assemblies at inner end of upper control arm front and rear legs. Follow adjustment procedures in exact sequence given.

Camber

Loosen nuts on inboard side of upper control arm cam bolts, then turn both front and rear cams in the same direction to adjust. Tighten cam bolts to 75 ft. lbs. (1964-67); 80 ft. lbs. (1968-73).

Caster

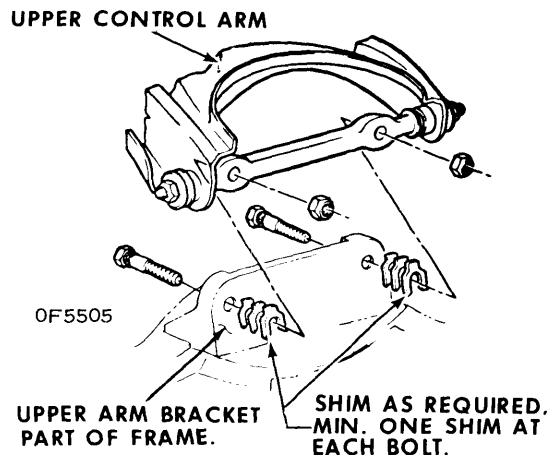
Adjust front cam so camber changes an amount equal to 1/4 the desired caster change, then adjust rear cam in opposite direction so camber setting returns to its correct position. Tighten cam bolts to 75 ft. lbs. (1964-67); 95 ft. lbs. (1968-73). **NOTE** - If not enough cam is available for adjustment, turn front cam so high part is up, and rear part is down. Then set camber and caster.



OLDSMOBILE CASTER & CAMBER
ADJUSTING SHIMS

PONTIAC (ALL MODELS) (1964-73)

Caster and camber adjustments are made by adding or removing shims at upper control arm inner shaft and mounting bracket bolts. After adjustment is completed tighten shaft bolts to 80-100 ft. lbs. (1964-67), 65 ft. lbs. (1968-69), 75-80 ft. lbs. (1970-72), 80 ft. lbs. (1973 Exc. Omega), 50 ft. lbs. (1973 Omega).



PONTIAC CASTER & CAMBER
ADJUSTING SHIMS

Caster

To adjust caster, raise car to remove weight from front wheel, and loosen control arm shaft-to-frame bolts. To decrease the positive caster add shims to front bolt. To increase positive caster remove shims from front bolt. A .030" shim change will change caster 0°23'.

Camber

To increase camber, remove shims from both front and rear bolts. To decrease camber, add shims to both front and rear bolts. A .030" shim change at both front and rear bolts will change camber approximately 1/6°.

NOTE - Adding or removing an equal amount of shims at both front & rear bolts will change camber without changing caster.